

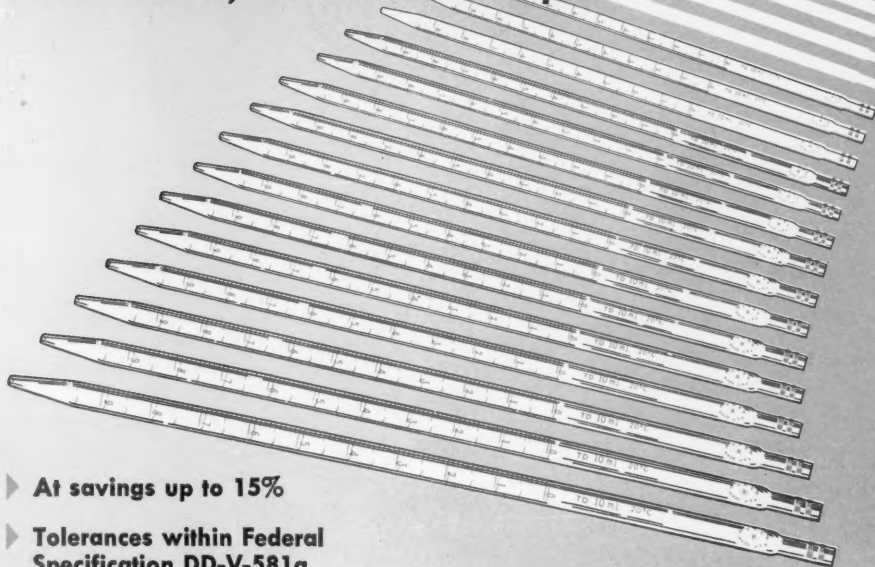
# SCIENCE

15 February 1957

Volume 125, Number 3242

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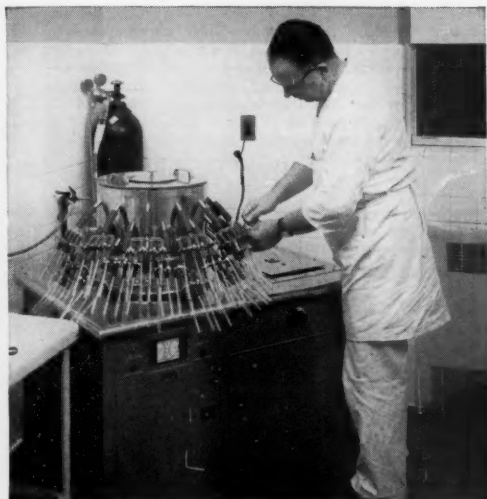
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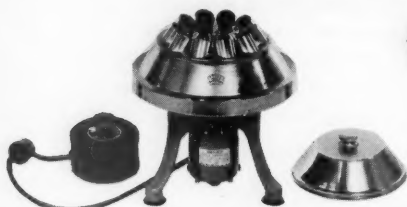


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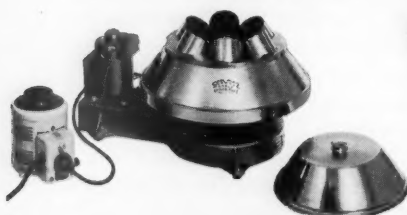
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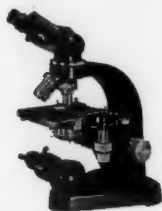
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### REFERENCES

- (1) Ind. & Eng. Chem. 25-653 (June, 1933)
- (2) Ind. & Eng. Chem. 25-1112 (Oct., 1933)
- (3) National Bureau of Standards Journal of Research 12-241 (Feb., 1934, R. P. No. 649)

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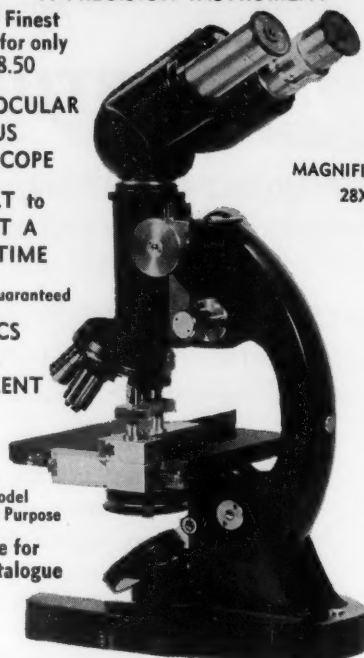
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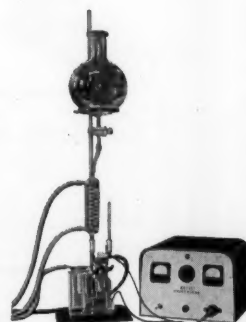
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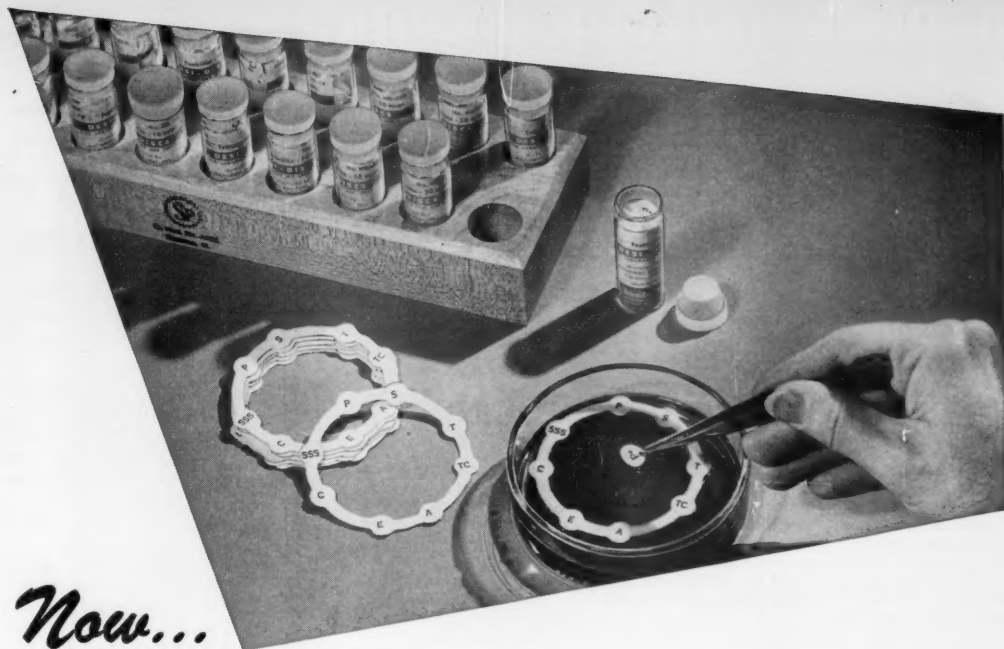
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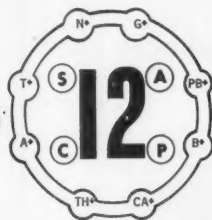
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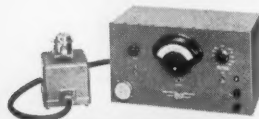
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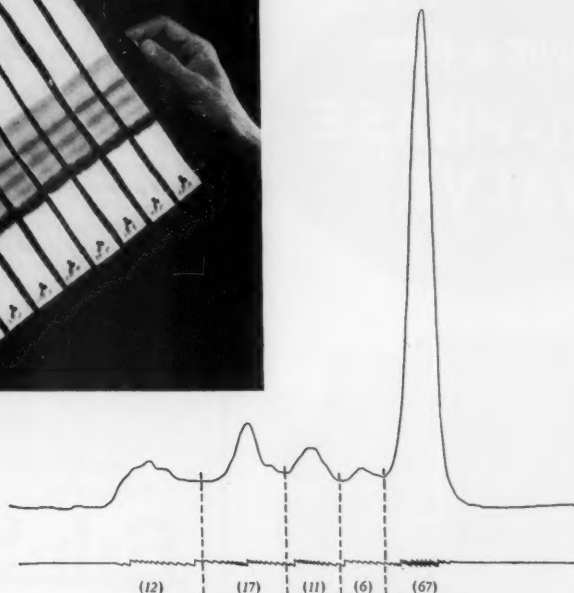
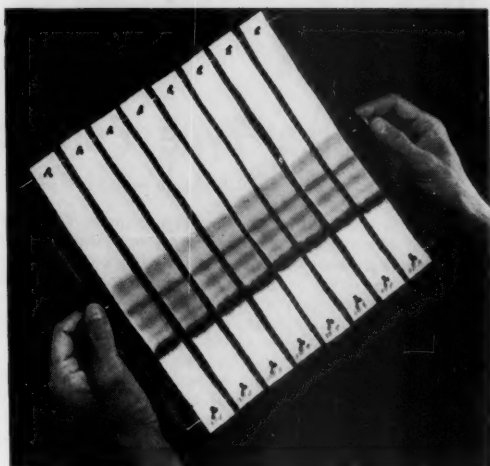
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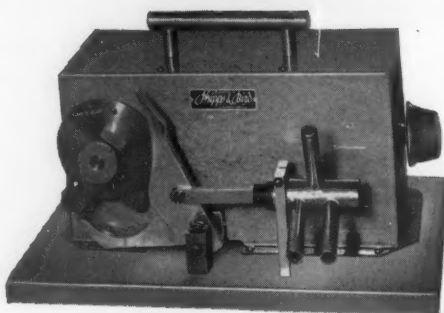
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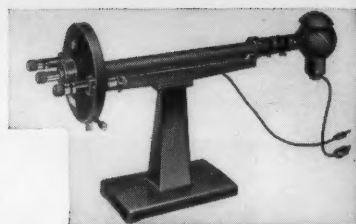
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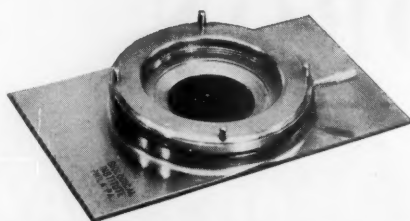


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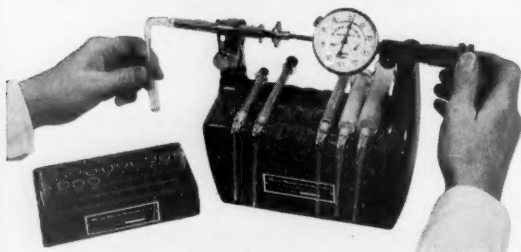
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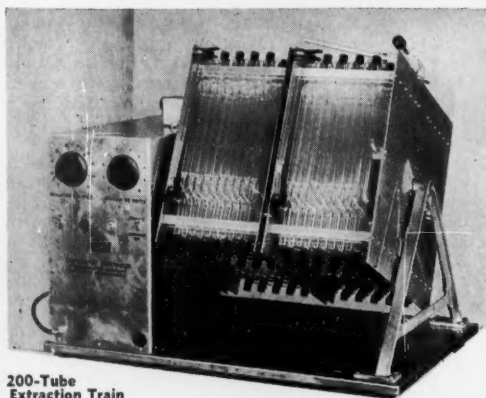
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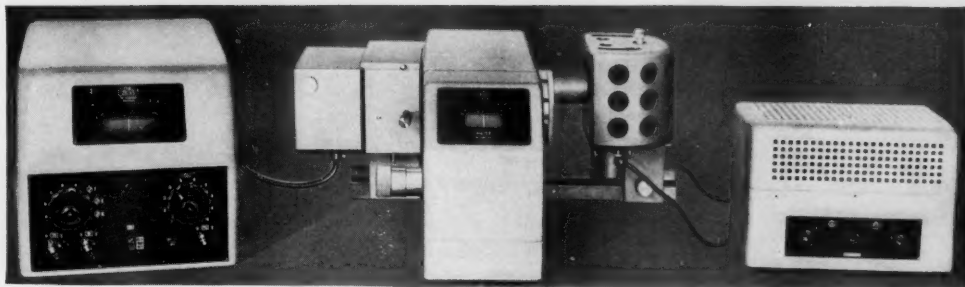
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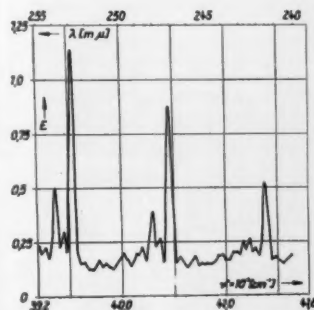


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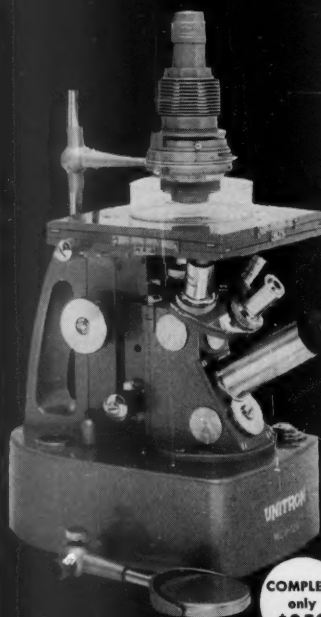
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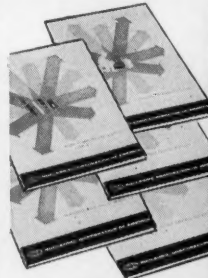
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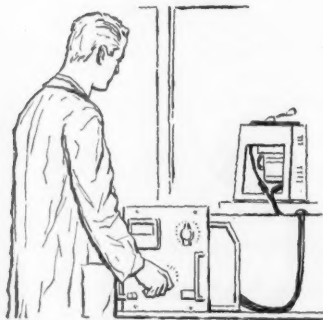
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## To the Barricades?

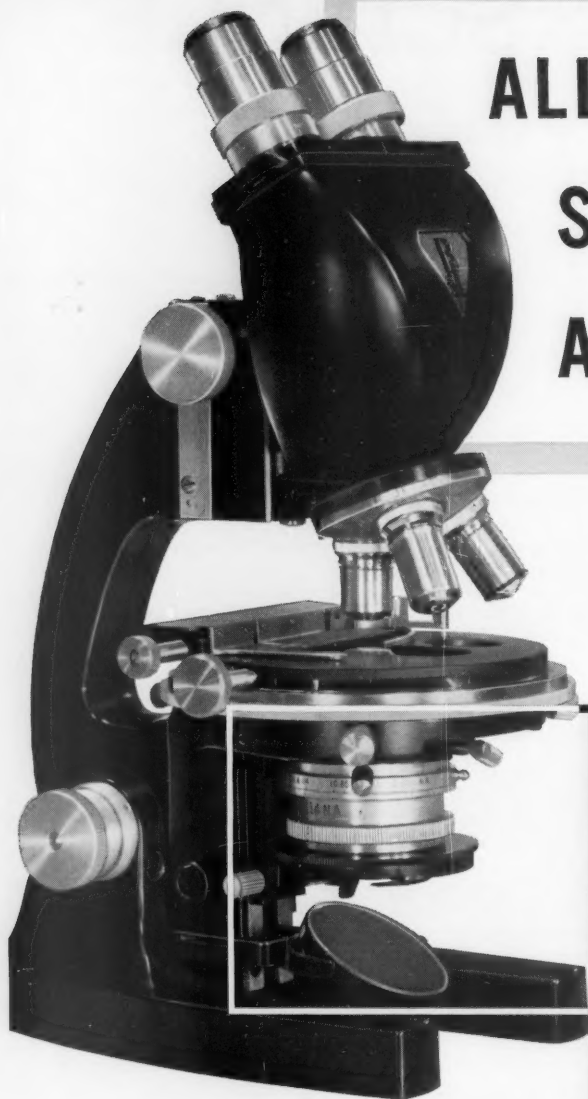
It is probable that none of the events at the New York meeting of the AAAS attracted as much attention as the report of the Interim Committee on the Social Aspects of Science [*Science* 125, 141 (editorial), 143 (25 Jan. 1957)]. The report was reprinted in full in the *New York Times*, and the main recommendations were widely publicized in other newspapers and magazines. In addition, the report inspired much editorial comment.

Here are some of the more favorable attitudes that were expressed about the report: The *Nation* said: "In historical perspective, it may be that the biggest story of 1956 was revealed . . . in the course of the generally sedate proceedings of the American Association for the Advancement of Science. . . ." and "What the report seems to be saying is that while the scientist proposes, it is left to the politician to dispose." The *Newsletter* of the Federation of American Scientists said: "The general tenor of the above statement [an excerpt from the report] will raise few eyebrows among FAS members; the crisis referred to has been at the cornerstone of Federation policy for ten years. What gives it significance, and makes it doubly welcome, is its source. . . . The scientific community has long had a social conscience; what is new is that this conscience may now be implemented by the community as a whole." The *New York Times* said: "The Association apparently tends now to act as a public representative of American science and scientists. . . . If done properly, this new role can be a helpful and constructive one. . . . All of us have a vital stake in assuring that our society adjusts properly to the revolutionary impact of scientific advance and to the enormously enhanced importance of scientists as a group."

Others took a more hostile view of the report. The *Indianapolis Star* said: "Another voice may soon be added to the hundreds already clamoring for the exclusive franchise to solve America's problems." In reference to the statement in the report that referred to "the pressing need that scientists concern themselves with social action," the *Star* commented: "Social action, when they put it that way, means political action," and, while granting that scientists have the duty to concern themselves with social problems, added, "but not as a pressure group. . . . Science will get farther in the end if its practitioners refuse to allow one of their greatest professional organizations to become a mere political action committee."

The *Wall Street Journal*, in an editorial entitled "Again the clear call," remarked: "It seems that we have heard all this before. Perhaps it was in the 1930's, when college professors all over the land were hearing the clear call to duty 'to accept the place' demanded by their importance." And, in reference to the committee statement that "scientific organizations may be obliged to accept a social responsibility commensurate with the importance of the social effect of science," the *Journal* said, "A clear call to the political barricades if we ever heard one."

It is well to remember that the Association has moved neither so far nor so fast as most of the comments imply. The Council called for the appointment of a larger committee which is to make a study and then report to the Board of Directors. This action of the Council insures that the important issues raised by the committee will receive careful and deliberate consideration. There is no immediate call to man the barricades, political or otherwise.—G. DuS.



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## Time Factors in Protein Biosynthesis

C. E. Dalglish

In spite of the voluminous literature rapidly accumulating on protein biosynthesis, no evidence is yet available concerning the time required for biosynthesis of a single molecule of any protein. This article is intended to draw attention to the mechanistic significance, apparently often unrecognized, of this unknown factor, and to advance what it is hoped may be a useful analogy.

It is generally considered that there are three likely mechanisms for incorporation of amino acids into protein, which are (i) by assembly on a "template" (usually considered to be ribonucleic acid), (ii) by exchange of free amino acids with corresponding residues in existing protein, and (iii) by transpeptidation or synthesis, or both, in free solution. The specificity of the amino acid sequence of at least large regions of proteins can only reasonably be accounted for in terms of a template hypothesis, which is now becoming widely accepted, and for which plausible detailed mechanisms can now be suggested (1, 2).

The absence of detectable intermediates between amino acids and proteins was at first assumed to indicate that amino acids arrived on the template surface, formed peptide bonds, and separated as a complete protein all as one effectively instantaneous process. If one considers even a small protein molecule of, say, 100 residues, it is obvious that the chance of the correct 100 amino acids colliding with the correct 100 positions on the template at effectively the same time is infinitesimal, and that even if this happened it is extremely unlikely that the protein could separate instantaneously as a unit from the template

(3, 4). The much more reasonable hypothesis was then advanced that the protein chain peeled off from the template as the amino acid residues combined (1). Such a process would imply a finite time for biosynthesis of a single molecule. One of us has proposed (3) an extension of this mechanism involving simultaneous attachment to a template of several growing peptide chains in varying stages of growth.

### One or More Growing Chains on a Template?

Suppose  $A_1, A_2, A_3 \dots A_{100}$  represent the amino acid residues of our hypothetical protein. Let us assume for this discussion that the peptide-bound residue just leaving the template surface is adjacent to the peptide bond being formed. A situation might then obtain which is represented diagrammatically in Fig. 1. Here  $T_1, T_2$ , and so forth represent the regions of the template with which residues  $A_1, A_2$ , and so forth become associated. As bond  $A_2-A_3$  is being formed, residue  $A_1$  is leaving the template surface. We can picture residue  $A_4$  as already in position on the template ready for formation of bond  $A_3-A_4$ , while residues  $A_5$  and  $A_6$  may still be in the medium approaching the template surface. Similarly, while residues  $A_9$  and  $A_{10}$  are combining, residue  $A_8$  would be leaving the template, carrying the partially formed protein molecule represented by residues  $A_1$  to  $A_8$ . This is only a diagrammatic representation; the distance between two growing peptide chains might be very different from that shown in the seven residues pictured in

Fig. 1, but the argument would not thereby be affected.

The alternative hypothesis, that a template carries only one growing chain at a time, is often assumed (for example, 4) but appears to us to be unlikely. In the case of our hypothetical protein of 100 amino acid residues, it would imply either (i) that residues  $A_1, A_2$ , and so forth are unable to approach the template until a completed protein chain has left the surface or (ii) that residues  $A_1, A_2$ , and so forth attach themselves to the template but do not combine until information is received from region of  $T_{99}$  and  $T_{100}$  of the template that synthesis of a protein chain has been completed. A plausible mechanism for the second alternative has not been suggested. The steric hindrance implied by the first alternative seems to us improbable and becomes more improbable the greater the length of the protein chain being formed. Steric hindrance would be further reduced if there were any tendency of the growing peptide chain to adopt a helical configuration, which would result in a considerable diminution of over-all length of the peptide relative to the corresponding portion of the template from which it has separated. (This spiralization of the growing chain can be readily visualized by anyone who has watched metal turnings coming off a lathe.) In our view, it is likely that vacant positions on a template will be filled with appropriate amino acids as soon as that region of the template becomes accessible and that peptide-bond formation and "peeling off" of the chain will occur as soon as the appropriate amino acids are in position on the template.

### An Analogy

If a template carries more than one growing chain at a time, the time of biosynthesis of a protein molecule ceases to be the same as the apparent time of synthesis per molecule, and it becomes all the more important to determine this true time for biosynthesis before drawing mechanistic conclusions.

The situation can conveniently be envisaged by analogy with an automobile factory. Here component parts (compared with amino acids) enter, are assembled in appropriate order on a pro-

The author is on the staff of the Postgraduate Medical School, London, England.



duction line, and finally leave as a completed automobile (compared with protein) without any free intermediate state (compared with peptides) that is obvious to an extramural observer. If it were observed that one automobile leaves the production line of such a factory every 30 seconds, it would be unjustifiable to assume that all the components were put together effectively simultaneously and therefore to deduce that the time of assembly of an automobile is 30 seconds. If it were known that  $n$  cars in various stages of construction were on the production line at any one moment, and the more reasonable assumption were made that the component parts were assembled consecutively rather than simultaneously, it would be possible to deduce that the time required for assembly of an automobile is  $30 \times n$  seconds.

A value analogous to  $n$  would be difficult to derive in the case of protein biosynthesis. The time required for automobile assembly could, however, be determined by feeding in labeled components and determining the time before emergence of the first car containing these components. Such an approach can be applied in the case of protein biosynthesis if labeled amino acid is added to an active protein-synthesizing system and the time before the appearance in the system of free labeled protein is determined.

A further complicating factor arises in the existence of "pools" not equilibrating directly with added exogenous amino acids. For example, Cowie and Walton (5) have shown that, in the food yeast *Torulopsis utilis*, added amino acids pass through such a pool; once they are included in this "bound" pool, their further reactions are little affected by changes in exogenous amino acids, even though they are not yet incorporated into protein.

In terms of our analogy, such a bound pool can conveniently be interpreted as a reserve of components for the automobile. Components can be imagined as being delivered onto a moving belt for transport to the production line. During the period they are on this belt, the com-

ponents are neither being incorporated into the automobile, nor are they interchangeable with further similar components being delivered. The time they spend on the moving belt may be an appreciable proportion of the time these components spend in the factory, either free or as part of an automobile, yet this time is not part of the true time of construction of the automobile.

Similarly, a completed protein may not be immediately detectable as a free molecule in solution but may pass through bound "pools," just as a completed automobile may not be immediately detectable on the roads until it has passed through, for example, a distributor's pool.

### Possible Experimental Approaches

If protein biosynthesis occurs by a template mechanism involving *de novo* synthesis from free amino acids, without occurrence of exchange reactions, time relationships should exist which are capable of experimental verification. The situation is illustrated in Fig. 2. The observed time  $T$  before the first appearance of free labeled protein, will be made up of two parts, a time  $t$  resulting from the synthetic process itself, and a time  $t_d$  required for such factors as diffusion of amino acids into cells, diffusion of newly synthesized protein out of cells, and time spent in bound pools.

If the specific activity of the free amino acid pool is constant, the total protein-bound activity should ultimately increase linearly. The protein-bound activity may not, however, increase linearly in the initial stages. Thus, if it is assumed that only a small part of the protein chain (presumably the "growing point") is attached to the template at any moment, it follows that for protein synthesis to occur it is not necessary for every amino acid residue in the protein to be present on the template at the same instant. If, then, one has formation on a template of a protein containing, for example, four glycine residues, and three of these residues have already been in-

corporated before labeled glycine is added to the system, the time of first appearance of free labeled protein, which will contain a label only in the fourth glycine residue, will not indicate the time for biosynthesis of a complete protein molecule. The time which it is necessary to observe is the time of first appearance of a labeled protein of maximum specific activity, indicated by  $T_1$  in Fig. 2.

The increase in protein-bound activity will ultimately cease to be linear because of protein degradation. The latter will not appreciably affect the linearity while the number of labeled protein molecules in the system is still small compared with the number of unlabeled molecules. These degradation reactions are those involved in the more usually measured turnover time of the protein, which is an expression of the average life of the whole molecule and bears no necessary relationship to the time of biosynthesis. In terms of our analogy, the expectation of life of an automobile on the roads (compared with turnover time) is not a necessary function of the time required to construct the automobile.

Under suitable conditions, it should be possible to break down the experimentally observed time  $T$  and to derive the time  $t$  that is appropriate to the synthetic process, and the time  $t_d$  that results from the sum of other factors, such as diffusion and the time spent by amino acids, or completed proteins, in bound pools. Two approaches appear promising, one of which is illustrated in Fig. 2. Suppose that the appropriate times, as defined here, in normal circumstances are  $T_1$ ,  $t_1$ , and  $t_d$  and that the rate of synthesis of protein is then modified by suitable activation or inhibition, while constant conditions of temperature and amino acid concentration, and so forth are maintained, so that the nonsynthetic factor  $t_d$  remains constant. Let the observed time before first appearance of protein of maximum specific activity now be  $T_2$ , and the true time of biosynthesis under the modified conditions be  $t_2$  (see Fig. 2). Then

$$T_1 = t_1 + t_d$$

and

$$T_2 = t_2 + t_d$$

In addition, the times required for synthesis under the different conditions should vary inversely with the rate of synthesis (to return to our analogy, in order to double the rate of production of automobiles, it is necessary to halve the time spent on the assembly line). If the rates of synthesis (that is, the slopes of the linear portions of the incorporation curves in Fig. 1) are  $S_1$  and  $S_2$ , respectively, then, in addition:

$$S_1/S_2 = t_2/t_1$$

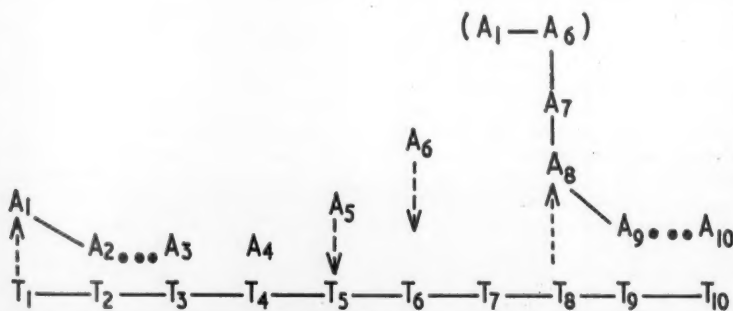


Fig. 1. Mechanism suggested for simultaneous formation of several protein chains on the same template.

As  $T_1$ ,  $T_2$ ,  $S_1$ , and  $S_2$  are known,  $t_1$ ,  $t_2$ , and  $t_d$  can be calculated, or alternatively,  $t_d$  may be deduced by extrapolation of the straight-line portion of the incorporation curves (Fig. 2) and determination of the intercept.

For this approach to be valid, it is essential, first, that the change in rate be due to a change in the rate of the actual synthetic process, and not, for example, to limitation of the supply of an essential amino acid. And second, there must be no simultaneous change in the amount of template material. An increase in the rate of protein synthesis is known often to be accompanied *in vivo* by an increase in ribonucleic acid, which is commonly assumed to be the template material. Results should therefore be expressed in terms of equivalent amounts of ribonucleic acid, but even this would be inadequate if an inactive (from the template point of view) form of ribonucleic acid is converted to an active form.

A second approach to separating the observed time  $T$  into its components  $t$  and  $t_d$  might be to observe the rates of formation of protein at different temperatures. In this case, both  $t$  and  $t_d$  can be expected to alter. If the variation of  $t_d$  with temperature could be predicted, it would again become possible to deduce the true time of biosynthesis,  $t$ .

If the biosynthesis of a single molecule of protein can be a lengthy process, one would therefore expect to find evidence of delays between addition of amino acids to a protein-synthesizing system and the first appearance of labeled protein. In fact, there are numerous examples of this in the literature. For example, Peters (6), studying synthesis of serum albumin *in vitro*, consistently found a delay of 15 to 20 minutes before the first appearance of labeled serum albumin. Similar results on synthesis of whole serum proteins *in vivo* were obtained by Green and Anker (7), while a comparable delay

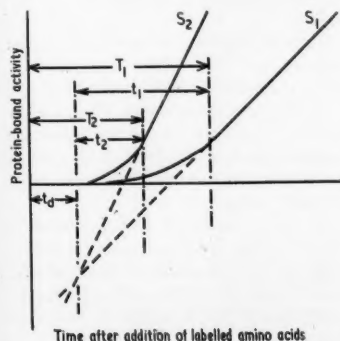


Fig. 2. Theoretical incorporation curves for the same protein-synthesizing system made to work at two different rates under otherwise constant conditions; from such curves the true time of synthesis of a single protein molecule could be deduced.

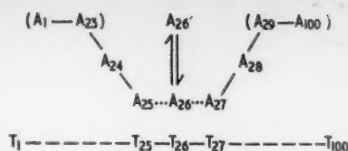


Fig. 3. The way in which the same template that controls *de novo* synthesis might also control exchange reactions.

in appearance of labeled  $\gamma$ -globulin *in vivo* has been found by Askonas, Humphrey, and Porter (8), and for Bence-Jones protein by Putnam, Meyer, and Miyake (9).

Green and Anker studied the delay in some detail. The delay of 20 minutes or so before first appearance of labeled protein was followed by a linear increase of protein activity for at least 50 minutes. The delay was independent of the nature or amount of labeled amino acid, but it varied with temperature, and it was considered to be specifically related to the biosynthetic process.

Junquiera, Hirsch and Rothschild (10) found a delay of about 50 minutes before the appearance of activity in rat pancreatic juice proteins, and they showed that this delay was not due to any appreciable extent to the time required for passage of the proteins down the pancreatic duct; they also pointed out that the existence of a long delay period is in itself evidence against the occurrence of incorporation by exchange, which involves few steps compared with synthesis of a complete peptide chain and for which no appreciable delay is therefore to be expected.

### Relationship Between *de novo* Synthesis and Exchange

The relationship between exchange and *de novo* synthesis is another aspect of protein biosynthesis that calls for further investigation. The occurrence of exchange without *de novo* synthesis has been shown unequivocally by Gale and his coworkers (for example, 11) to occur in bacterial systems. This exchange, like *de novo* synthesis, is an energy-requiring process. It appears often to be assumed that exchange and *de novo* synthesis involve different mechanisms, but it seems more likely to us that pure *de novo* synthesis and pure exchange are the two extremes of a common mechanism.

It has already been suggested as likely that as soon as a growing peptide chain leaves the template surface, this surface will be ready to receive appropriate amino acids. In the ordinary course of cellular events, it is to be expected that a protein chain in the medium might also collide with the template surface. If part of such a protein chain were to collide with the corresponding part of a

template, it is not unreasonable to suppose that temporary attachment might ensue over a short region, with labilization of the appropriate residues and possible exchange, as represented diagrammatically in Fig. 3.

If active *de novo* synthesis were occurring, the partially formed peptide chains attached to the template would be likely to hinder the approach to the template of a free protein molecule in the medium, so that under these conditions exchange would not be likely to contribute significantly to amino acid incorporation. On the other hand, if an essential amino acid were lacking, so that protein synthesis could not proceed (as is the case in Gale's experiments where exchange occurs), the free protein molecules in solution should be able to approach the template very much more easily, with the resultant possibility of amino acid exchange.

Experiments in this laboratory on the biosynthesis of rat pancreatic ribonuclease (12) have suggested that the balance between the contributions to amino acid incorporation of *de novo* synthesis and exchange may be markedly altered between *in vivo* and *in vitro* systems. It thus seems desirable to determine times of biosynthesis under conditions as near as possible to those obtaining *in vivo*.

Small proteins, especially those with specific biological actions, are likely to contain a specific arrangement of all amino acid residues. Formation on a template of the complete molecule of such proteins is therefore likely. In the case of large protein molecules, however, the possibility that certain regions formed specifically on templates are combined to regions formed nonspecifically must also be considered, and the problem of determining the time of biosynthesis of a molecule formed in such a way is formidable. However formidable such problems may be, it is hoped that this discussion has demonstrated the importance for the elucidation of mechanisms of protein biosynthesis of the determination of the time required for biosynthesis of single protein molecules.

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## News of Science

### NSF to Support In-Service Training for High-School Teachers

The National Science Foundation has announced that it will accept proposals to support, on an experimental basis, about 15 In-Service Institutes for Secondary-School Teachers of Science and Mathematics to be held during the academic year 1957-58. Summer and academic-year institutes are presently operating in 111 colleges and universities throughout the United States with support from the foundation.

In-Service Institutes for Secondary-School Teachers of Science and Mathematics will offer work in the subject matter of science or mathematics especially designed for secondary-school teachers. Institute meetings will be held outside regularly scheduled school hours—evenings, Saturday, or late afternoons—so that teachers may attend while still teaching full time in their schools. A typical institute might meet once a week for 2 hours, with perhaps half of the meetings devoted to laboratory work, for the full academic year of about 30 weeks.

Past experience has indicated that most secondary-school teachers desire academic credit, preferably graduate credit, for work successfully completed at the institutes. If such credit were given for an in-service institute, it might amount to two credit-hours per semester, or four per year. Such credit would, of course, be only at the discretion of the host institution. The in-service institute program contemplates that each group will be kept to about 15 members so that discussion may be full and free.

No stipend would be given directly to teacher-participants in the institute, but the grant would cover all usual tuition and fee charges of the host institution and any other direct costs to the host institution which may be directly attributable to the program.

It is hoped that in-service institutes may be established by many of the smaller, excellent colleges and universities outside metropolitan areas, as well as by larger institutions in urban centers, in order that teachers in outlying school districts may enjoy the advantages of training facilities not otherwise readily accessible to them.

Each application should outline the program intended, list the staff which will conduct it (as far as possible at such a preliminary date), mention special facilities which will be used, give opening and closing dates of the institute, criteria for admission, nature of academic credit attainable, a detailed budget, and a summary of any collateral support from the host institution or outside sources.

Fifteen copies of the complete proposal must be submitted. One copy of the proposal must bear the signature of the director of the program and of the college or university official authorized to sign for the host institution.

Foundation support will cover all tuition and fees plus any direct costs to the college or university directly attributable to the program. Deadline for submission of completed proposals to the foundation is *15 Mar. 1957*. Further details may be obtained from the Division of Scientific Personnel and Education, National Science Foundation, Washington 25, D.C.

### British Antarctic Base

Extremely rough ice conditions have forced the British Commonwealth trans-Antarctic expedition to give up its plan for a base on the western side of McMurdo Sound. Sir Edmund Hillary, leader of the Pacific element of the expedition, reports that the base will be established instead at Pram Point, on Ross Island near the United States air operating facility on the east side of the sound.

### New Atom Tests

A series of low-yield nuclear tests will be conducted at the U.S. Atomic Energy Commission's Nevada Test Site, with the cooperation of the Department of Defense, beginning in late spring 1957. Tests of high-yield devices are not conducted in Nevada. The development of weapons for defense against attack is a major objective. Studies of weapons effects will also be continued in order to improve military and civil defense against nuclear attack. The Federal

Civil Defense Administration will participate in the series.

An extensive radiation monitoring network will again be used during the series. About 12 monitoring teams supplied by the U.S. Public Health Service will be stationed in communities near the test site. In addition, the Public Health Service network of monitors in about 40 cities across the nation, established prior to the last Eniwetok test series in the spring of 1956, will be in operation. Radiological monitoring also will be conducted at 12 commission installations. About 100 U.S. Weather Bureau stations will cooperate in this program.

### Atomic Energy Hearings

The Joint Committee on Atomic Energy plans to hold public hearings beginning 19 Feb. to receive testimony from representatives of the U.S. Atomic Energy Commission, industry, and other interested individuals and organizations on the development, growth, and state of the atomic energy industry. Section 202 of the 1954 Atomic Energy Act requires that such hearings be held during the first 60 days of each new session of Congress.

The hearings are tentatively scheduled for 19-21 Feb. and 26-28 Feb., depending on the number of witnesses who wish to appear. It is presently planned to have the Atomic Energy Commission representatives lead off the first day and to have industrial and other interested witnesses appear on the days following. Those who do not wish to appear personally will be given opportunity to present statements for the record. Further information may be obtained from the committee staff, Room F-88, The Capitol.

### Scientists Rebel in Soviet

A majority of the Soviet Union's most eminent mathematicians and physicists have challenged the present political control of Soviet science. They appear to have made progress in their demand that leading Soviet scientists be allowed democratic control over the development of Soviet science.

News of this revolt, as contained in the latest issue of the *Vestnik Akademii Nauk SSSR* (herald of the U.S.S.R. Academy of Sciences), was reported recently by Harry Schwartz in the *New York Times*.

The essence of the controversy was revealed in the dissenting speech of one of the Soviet Union's leading nuclear physicists, Igor E. Tamm, a scientist who does not belong to the Communist party.

He explained that under the acad-



emy's charter, the direction of its basic scientific work is supposed to be decided by majority vote at general meetings of its members.

This has not been true in past years, Tamm said. Most general meetings of the academy, he said, have been purely for show purposes. The annual comprehensive reports of the academy's chief scholarly secretary never have been discussed. As a result, the membership has not been able to exercise the directive role it is entitled to under the charter.

The dissenters won a partial victory. The academy publication reports that the present president, Alexander N. Nesmeyanov, was reelected, though not by unanimous vote, without any postponement in the election date. At the same time academy members adopted a resolution instructing their president to draw up a detailed report on the proposed future development of Soviet scientific research and to deliver this report at a general meeting of the academy.

### Cooperative Abstracting

On 1 Jan. *Biological Abstracts* and *Psychological Abstracts* initiated a modification of their 28-year-old agreement for the exchange of abstract reprinting privileges. This modification, it is hoped, will serve as a pattern for an attack on the problem of the costly and inefficient duplication of abstracting efforts that plagues the documentation of science today. Although the two services have exchanged abstracts since 1929, heretofore there has been no systematic attempt to apportion responsibility for coverage so that duplicate abstracting efforts could be avoided.

Now, however, in keeping with the "General principles of cooperation on biological abstracting" [*Science* 123, 578 (1956)] the two services have agreed to share abstracting responsibility through a guaranteed coverage of certain journals that are essential to their respective fields of interest. Thus, for example, those journals primarily concerned with physiology or neurology that contain occasional articles of psychological interest will be the abstracting responsibility of *Biological Abstracts*. *Psychological Abstracts* will refrain from abstracting these journals but will reprint in its pages those *BA* abstracts that are pertinent to its audience. Similarly, *Psychological Abstracts* will assume full responsibility for the complete abstract coverage of those psychological journals that contain occasional articles of physiological and neurological interest, and *Biological Abstracts* will reprint those *PA* abstracts that are of value to its readers.

Initially this shared abstracting responsibility will involve a total of about

50 journals. It is expected that elimination of the former duplication in abstracting will enable each service to redirect the efforts thus saved into areas incompletely covered at present. In addition to covering a group of specific journals, each service will be free to reprint an additional number of abstracts selected at random from the pages of the other service. The limit set for these reprints is 500 abstracts for *Biological Abstracts* and 1000 for *Psychological Abstracts*.

### German Archeological Find

West German archeologists have discovered 750 burial urns dating from about 100 B.C. to A.D. 100. Traces of funeral pyres also were found. These included some rare specimens—wooden containers, unharmed by rot because they were charred. In addition, the graves contained iron swords, bronze armlets, Roman coins, and glass vessels.

Near the site, which is at Wederath in the Hunsrueck Mountains, is another burial ground containing 42 burial mounds thought to date from about 400 B.C. Excavations have ended for the winter but will be resumed in the spring.

### Science Secretary Proposed

A proposal to include a Secretary of Science in the Cabinet of the President because of the importance of science to the survival of democracy was advocated in the science section of the *Saturday Review* (2 Feb. 1957). In the event that interdepartmental rivalry in Washington blocks creation of a new Cabinet post, the *Review* proposes the appointment of a Science Commission in the Executive Department, with authority and prestige equal to the Bureau of the Budget, the Board of Economic Advisers, and the National Security Council.

### Nuclear Power Plant Ceremony

The first nuclear power system in the United States designed and built solely for experimentation in the generation of electric power was formally put into operation at the Argonne National Laboratory of the Atomic Energy Commission on 9 Feb. Participants in the ceremony included members of the Joint Committee on Atomic Energy of the Congress, AEC officials, members of the Argonne staff, and representatives of the University of Chicago, which operates the laboratory for the AEC.

Now that it is in continuous full operation, the experimental boiling-water reactor (EBWR) is supplying 5000 kilo-

watts of electric power to the laboratory. Of the original five reactor projects in the AEC civilian power reactor development program launched in 1954, the EBWR is the first to be completed and to generate electricity.

### Radiation Dose Standards

The National Committee on Radiation Protection and Measurement (NCRP) has introduced new recommendations on permissible radiation exposure. In making the new recommendations, the committee reviewed its past recommendations in the light of increased knowledge about the long-range effects of radiation exposure on the genetic make-up and life-expectancy of man. The recommended changes will be incorporated in revised editions of the NCRP Handbooks of the National Bureau of Standards.

### International Atomic Energy Statute

The 90-day period during which the Statute of the International Atomic Energy Agency was open for signature ended at midnight, 23 Jan., with the signatures of the representatives of 78 countries affixed to the document. Seventy countries signed the statute on 26 Oct. 1956, the last day of the 81-nation conference at United Nations headquarters at which it was unanimously approved, and the eight others have signed since then.

Under Article XXI of the statute, signatory states become parties to the statute when they deposit an instrument of ratification. The statute will come into force when 18 states have deposited ratifications, provided that three of the following states are included: Canada, France, the U.S.S.R., the United Kingdom, and the United States. The instruments of ratification, which are expected to start coming in during the course of the next few months, will be deposited with the Government of the United States, which has been designated as the depository government.

After the statute has come into force, a general conference will be called in order to bring the International Atomic Energy Agency into existence. The statute provides that the objectives of the agency shall be "to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world" and to insure that assistance provided by it "is not used in such a way as to further any military purposes."

For the interim period, until the first board of governors is elected by the first general conference, a Preparatory Commission of 18 governments has been cre-



ated in order to devise the blueprints for the organization of the agency. This Preparatory Commission, according to Annex I of the statute, shall make studies, reports, and recommendations for consideration by the first session of the general conference and the first meeting of the board of governors on the financing of the agency, its program of work, and its budget. It shall also make recommendations concerning the location of the permanent headquarters of the agency and the agreements defining the relationship to the United Nations and to other international organizations working on specific aspects of atomic energy problems.

The commission held its first meetings at United Nations headquarters immediately upon the conclusion of the conference on the statute on 26 Oct. 1956. Its executive secretary, Paul Rodolphe Jolles, came to New York from Switzerland to take up his duties.

The text of the statute of the International Atomic Energy Agency is available as document IAEA/CS/13.

### Eastern TB Committee

The International Conference on Tuberculosis that took place in New Delhi, India, recently established a permanent Eastern regional committee to intensify operations for the control of TB. Its headquarters will be in New Delhi. P. V. Benjamin, tuberculosis adviser to the Indian Government, was elected president of the committee, which will be composed of 21 Asian members. They include Australia, Burma, People's Republic of China, Cambodia, Hong Kong, South Korea, South Vietnam, Pakistan, Singapore, and the Philippines.

The committee will meet once a year in the various capitals to pool knowledge and resources and to evolve a common program to combat tuberculosis. The group will operate as part of the International Union against Tuberculosis, which has its headquarters in Paris.

### Teachers Institute

Some 45 high-school teachers will spend the 1957-58 academic year at Harvard University in an Institute for Teachers of Science and Mathematics. The fellows will receive cost-of-living grants and tuition. The institute is part of a nation-wide program of academic-year and summer institutes supported by the National Science Foundation.

The program of study will include both standard scientific courses that have been adapted to meet the needs of secondary-school teachers and special seminars. Edwin O. Kemble, a theoretical

physicist with considerable experience in teaching both the elementary and advanced aspects of his subject, will be director of the institute.

The program is open to experienced teachers of science under 50 years of age, to younger teachers of ability who feel the need for additional background training, and to teachers who are under pressure to teach sciences outside the scope of their own basic college training. Application for admission must be completed by 21 Feb.

### Applied Mathematics at Brookhaven

An applied mathematics division has been established at Brookhaven National Laboratory, Upton, N.Y. Milton E. Rose, a mathematician for the Office of Naval Research, Washington, D.C., has been appointed head of the division and will assume his duties this month.

As its chief tool, this new division will operate a high-speed digital computer that will be used chiefly for basic research and engineering development work. The final design characteristics of the computer are being planned jointly by members of the applied mathematics division and the instrumentation division, under the direction of William A. Higinbotham, head of the latter. Construction has already started on the machine, which is expected to be in operation in less than 2 years.

### Collaboration Invited at Brookfield Zoo

The Chicago Zoological Society has recently initiated a program designed to promote research at the Zoological Park at Brookfield, Ill. The collaboration of investigators from the Chicago area and elsewhere is invited.

Provided that there is no interference with the health or exhibition use of the animals, basic or utilitarian research proposals are welcomed in the fields of behavior, physiology, pathology, parasitology, and evolution. In general, financial support for projects must come from outside sources. Projects are passed on by the scientific advisory committee of the society, which consists of Alfred E. Emerson, department of zoology, University of Chicago; Smith Freeman, chairman of the department of biochemistry, Northwestern University Medical School; Karl P. Schmidt, chief curator of zoology emeritus, Chicago Natural History Museum; Robert Bean, director of the Chicago Zoological Park; and Tappan Gregory of Chicago, a lawyer and naturalist.

Among the studies the society is currently assisting are continuing investiga-

tions by A. H. Riesen of the University of Chicago on the dependency of behavior in primates on initial visual experiences [an early report appeared in *Science* 106, 107 (1947)] and work on the importance of the enzyme cholinesterase in central nervous system activity by J. Bernsohn of the Veterans Administration Hospital at Hines and the Northwestern University Medical School.

Some space and laboratory facilities in the animal hospital at the park are available for research activities. The bacteriologist at the hospital, Evelyn B. Tilden, and the veterinarian, Weaver M. Williamson, will be available for consultation and assistance on some research projects.

Since November 1956, the program has been under the direction of George B. Rabb, curator and coordinator of research. Inquiries should be addressed to him at the Chicago Zoological Park, Brookfield, Ill.

### Proposed Legislation

Of the many bills introduced in Congress, some have a special relevance to science and education. A list of such bills introduced recently follows:

HR 503. Protect public health by regulating manufacture, compounding, processing, distribution, and possession of habit-forming barbiturate and amphetamine drugs. Byrnes (R Wis.) House Interstate and Foreign Commerce.

HR 613. Provide for establishment of U.S. Foreign Service Academy. Donohue (D Mass.) House Foreign Affairs.

HR 560. Establish programs to facilitate procurement of scientists and technicians for armed forces. Bennett (D Fla.) House Armed Services.

HR 564. Facilitate procurement of doctors of medicine and doctors of dentistry for armed forces, by providing grants and scholarships for education in medical and dental professions. Bennett (D Fla.) House Armed Services.

S J Res 17. Establish Joint Committee on Scientific Research, Thye (R Minn.) Senate Labor and Public Welfare.

HR 562. Establish in Department of Health, Education, and Welfare an Office for Senior Citizens. Bennett (D Fla.) House Education and Labor.

HR 612. Establish sound and comprehensive national policy re fisheries; create and prescribe functions of U.S. Fisheries Commission; strengthen fisheries segment of national economy. Donohue (D Mass.) House Merchant Marine and Fisheries.

S 305. Amend Mineral Leasing Act for acquired lands to require competitive bidding for leases of deposits of oil and gas not within any known geologic struc-

ture of a producing oil or gas field. Williams (R Del.) Senate Interior and Insular Affairs.

S 334. Amend sec. 27 of Mineral Leasing Act of 25 Feb. 1920, as amended (30 U.S.C., sec. 194), to promote development of phosphate on public domain. Murray (D Mont.), Mansfield (D Mont.), Scott (D N.C.) Senate Interior and Insular Affairs.

S 342. Implement 10-year Mission 66 plan undertaken for public benefit re rehabilitation, improvement, and preservation of National Park System. Watkins (R Utah) Senate Interior and Insular Affairs.

HR 595. Amend Atomic Energy Act of 1954 re transfer of restricted data for military purposes. Cole (R N.Y.) Atomic Energy.

HR 601. Provide rewards for information re illegal introduction into U.S., or illegal manufacture or acquisition in U.S., of special nuclear material and atomic weapons. Cole (R N.Y.) Atomic Energy.

HR 576. Authorize Secretary of Interior to construct, operate, and maintain in upper Snake River Valley, Idaho and Wyoming, the Narrows federal reclamation project and a regulating reservoir below Palisades Dam and Reservoir. Budge (R Idaho) House Interior and Insular Affairs.

## Scientists in the News

H. POLAK, former scientific attaché at the Netherlands Embassy in Washington, D.C., joined the Atomic International Division of North American Aviation Inc., Los Angeles, Calif., on 1 Feb.

THOMAS GOLD, chief assistant to the Astronomer Royal of Great Britain for the past 4 years, became a professor of astronomy at Harvard University on 1 Feb. Recently he has been serving as a visiting professor at Cornell University, where he has been teaching cosmic radiation and radio astronomy.

Gold is known for theoretical and instrumental studies in a wide range of astronomical phenomena. He is one of England's Cambridge group of cosmologists which put forward the thesis of continuous creation of matter in the universe. He also demonstrated the possibility that dark regions on the moon are great dust layers rather than massive flows of lava. In earth studies, he worked out the mechanics of a possible shifting of the north and south poles. The shifting of the poles is one hypothesis advanced to explain how ice once covered regions now in the tropics.

Gold's latest work is a detailed analysis of the burst of cosmic radiation,

largest on record, that resulted from the solar flare of 23 Feb. 1956. This study includes cosmic radiation, and ionospheric, magnetic, and solar data.

Rear Admiral RICHARD E. BYRD has canceled plans to join the American expedition in the Antarctic so that he may remain in Washington to supervise preparation of legislation which would set up a presidential commission to coordinate all polar operations. The proposed commission, a plan for which has been drafted by James E. Mooney, an associate of Byrd's, would serve as a central clearinghouse for such explorations.

WINDSOR C. CUTTING has resigned as dean of the Stanford University Medical School. No reason was given in the university's announcement, which was made public on 23 Jan.

DOUGLAS H. EWING, vice president of RCA Laboratories, has been named vice president, research and engineering, of the Radio Corporation of America. He will be responsible in his new position for RCA Laboratories and RCA's Engineering Services. The new appointment was one of several announced in RCA's research and engineering organizations. The others follow.

JAMES HILLIER, who has been chief engineer, RCA Commercial Electronic Products, has been named general manager, RCA Laboratories.

GEORGE H. BROWN, who has been director of the Systems Research Laboratory, RCA Laboratories, is now chief engineer, RCA Commercial Electronic Products.

HUMBOLDT W. LEVERENZ, who has been director of the Physical and Chemical Research Laboratory, RCA Laboratories, has been appointed assistant director of research, RCA Laboratories. All of the new appointees, with the exception of Brown, will make their headquarters at the David Sarnoff Research Center, Princeton, N.J. Brown will have his office in Camden, N.J.

NICHOLAS J. HOFF, professor and head of the aeronautical engineering department at Polytechnic Institute of Brooklyn, N.Y., has been appointed professor and executive head of the new Division of Aeronautical Engineering at Stanford University, effective 1 Sept. Aeronautical engineering, heretofore in the university's department of mechanical engineering, will be established as an autonomous division in the School of Engineering.

DAVID H. MORGAN, former president of Texas Agricultural and Mechanical College, has been appointed director

of college relations for the Dow Chemical Company. One of his major functions will involve liaison with institutions of higher learning to encourage industry-education cooperation for the advancement of science and engineering and to stimulate student interest in the various scientific fields.

HERBERT P. BROIDA has been selected to head the newly organized Free Radicals Research Section at the National Bureau of Standards. ARNOLD M. BASS has been named assistant chief of the section, and JAMES W. MOYER is consultant. The section will serve as the central laboratory for a national program of basic research in free radicals. The object of the program is to increase fundamental knowledge of the formation, properties, and storage of these highly reactive molecular fragments.

Broida will be serving in a dual capacity as chief of the new section and as technical coordinator of research on free radicals throughout the bureau. In the latter area, he will be responsible for the fostering of interest on the part of individuals in the various NBS technical divisions, furnishing of technical advice to those undertaking free radicals research, and maintenance of a comprehensive information and communication service on this program.

Recipients of the 1956 Nash conservation awards have been announced by the American Motors Corporation. Ten professional workers, selected as typifying America's professional conservationists, each will receive \$500 and a bronze plaque. In addition, plaques will be awarded to 10 nonprofessional conservationists, whose contributions to the conservation of natural renewable resources (soil, water, forest, fish, and wildlife) were made as acts of good citizenship. The winners were selected by a committee of conservationists from nominations submitted by officials of state, federal, and private conservation agencies.

Winners in the professional class are as follows:

MARSHALL T. AUGUSTINE, Annapolis, Md., work unit conservationist for the U.S. Department of Agriculture's Soil Conservation Service, for his enthusiasm and leadership in promoting sound soil and water conservation practices in Anne Arundel County, particularly in the combatting of soil erosion.

RICHARD J. DORER, St. Paul, Minn., supervisor of the Bureau of Game, Minnesota Department of Conservation, for his long years of effort to create and preserve proper habitat for wildlife, and particularly for his part in launching the "Save Minnesota's Wetlands" campaign.

CHARLES D. KELLEY, Montgom-

ery, Ala., for his leadership in organizing resistance to the damming of the Tombigbee River, which would have destroyed large areas of wetlands and wildlife habitat, and the development of a compromise program of river improvement that left wildlife, forest, and recreational values unimpaired. Now with the Alabama Department of Conservation, Kelley was, at that time, secretary of the Alabama Wildlife Federation.

**BERNARD F. MANBEY**, Berkeley, Calif., regional chief of lands of the National Park Service, Region Four, for his outstanding administrative skill in connection with the establishment of Kings Canyon National Park, and his extraordinary accomplishments in the acquisition of privately held lands within the boundaries of National Park Service areas.

**LEON J. McDONALD**, Stillwater, Okla., assistant state conservationist of the Soil Conservation Service, for his outstanding work in spreading information about soil conservation, through speaking engagements, brochures, and magazine articles. Altogether, McDonald has addressed more than 500,000 people at nearly 2000 meetings, and has demonstrated unusual ability to work with diverse groups of people in furthering the cause of soil conservation.

**ROGER T. ROBINSON**, Anchorage, Alaska, operations supervisor with the Department of the Interior's Bureau of Land Management, Area Four, for his untiring efforts since 1940 to stop the careless waste of Alaska's forest resources by fire and exploitation, through the creation of an effective fire-fighting organization, and the dissemination of fire-prevention educational material.

**J. CLARK SALYER II**, Washington, D.C., chief of the Branch of Wildlife Refuges, U.S. Fish and Wildlife Service, for his work in building a system of wildlife refuges and his determined vigilance in defending the integrity of the refuges against threats of destructive exploitation.

**JAMES K. VESSEY**, Milwaukee, Wis., assistant regional forester with the U.S. Forest Service, for his work in developing high-standard public forest management programs and encouraging and initiating similar programs on state and private lands, and particularly for his ability to work harmoniously with people at every level and viewpoint.

**RICHARD L. WEAVER**, Ann Arbor, Mich., associate professor of conservation and education at the University of Michigan, for his two decades of leadership in the field of conservation education, as a graduate student, teacher, state advisor, officer of many national conservation organizations, and professor of conservation.

**NORMAN G. WILDER**, Dover, Del.,

director of conservation for the Delaware Board of Game and Fish Commissioners, for his work in developing a soundly conceived basic state-wide program of wildlife management, and particularly for his successful work in wetlands acquisition, development, and management.

Winners in the nonprofessional class are as follows:

**L. C. BINFORD**, attorney of Portland, Ore., for his work as a local officer of the Izaak Walton League and particularly for his part in inaugurating the "Red Hat Day" program for improving relations between sportsmen and land owners through education of sportsmen to their basic responsibilities.

**EDWIN R. CONKLIN**, high-school teacher of Butler, N.J., for his work in promoting a "junior sportsman" program of training in firearms safety and fundamentals of conservation, in the Butler High School.

**HOYT FERM**, junior high-school instructor of Iron River, Mich., for his successful integration of conservation education in his school science classes.

**PAUL H. FLUCK**, physician of Lambertville, N.J., for his series of volunteer bird-banding lectures and demonstrations given at Washington Crossing Park, N.J. Fluck's programs have been seen by more than 40,000 visitors since May 1952.

**WALTER A. FORRED**, clergyman of Vermillion, S.D., for his help in developing and promoting the "North Dakota Plan" of rural church action in support of sound soil and water conservation measures.

**HERMAN FORSTER**, attorney of New York, N.Y., for his work as an officer and a tireless leader of the New York State Conservation Council since 1939, during which period he helped to make this sportsmen's federation one of the nation's most outstanding in terms of sound conservation policies.

**ETHEL L. LARSEN**, clubwoman of Manistee, Mich., for her many years of work in promoting sound conservation principles as an officer and conservation consultant to the General Federation of Women's Clubs.

**JOHN R. LYONS**, research consultant of San Diego, Calif., for his work as secretary of the Citizens Forestry Study Group of San Diego County, which he helped to form in 1951 as a means of educating citizens in forest fire prevention.

**FREDERICK W. STURGES**, businessman of Macon, Ga., for his work in organizing the Georgia Conservation League, Inc., a statewide federation of sportsmen's clubs affiliated with the National Wildlife Federation.

**LES WOERPEL**, businessman of Stevens Point, Wis., for his remarkable work as executive secretary of the Wis-

consin Federation of Conservation Clubs, particularly his editing and publishing of *News and Views*, a bulletin on conservation information that he sends to all members of Wisconsin conservation clubs.

## Recent Deaths

**WILLIAM H. BOEHM**, New York, N.Y.; 88; former dean and professor of engineering at Clemson College; 23 Jan.

**HARRY S. BUECHE**, Newark, Del.; 50; associate professor of electrical engineering at the University of Delaware; 27 Jan.

**CARLETON E. DAVIS**, Merion, Pa.; 87; engineer with the Isthmian Canal Commission in 1904-05 who worked in the program of eliminating yellow fever and preparing for the building of the canal; 29 Jan.

**HELEN MILES DAVIS**, Washington, D.C.; 61; editor of *Chemistry*, member of staff of Science Service, and writer who specialized in the popularization of science; 25 Jan.

**JOSEPH W. FAY**, Villa Park, Ill.; former research engineer for the Western Electric Company; 28 Jan.

**WILLIAM D. FROST**, Madison, Wis.; 89; professor emeritus of bacteriology at the University of Wisconsin and one of the founders of the medical school at the university; 25 Jan.

**GEORGE D. LOUDERBACK**, Berkeley, Calif.; 82; professor emeritus of geology, former chairman of the department and dean of the College of Letters and Science at the University of California; 27 Jan.

**ENOCH RECTOR**, New York, N.Y.; 94; inventor who worked with Thomas A. Edison on the phonograph and methods of sound reproduction and on motion pictures; 26 Jan.

**ROBERT NEAL RUDMOSE-BROWN**, Sheffield, England; 77; professor emeritus of geography at Sheffield University; naturalist on the Scottish National Antarctic Expedition aboard the *Scotia* in 1902-04; 27 Jan.

**KIYOSHI SHIGA**, Sendai, Japan; 87; bacteriologist considered to be one of the leaders in the introduction and development of modern medicine in Japan; 25 Jan.

**JACOB B. SHOHAN**, West Orange, N.J.; 59; president of the Meta Chemical Corporation and a leader in industrial development in Israel; 24 Jan.

**WILLIAM R. WALLACE**, Salt Lake City, Utah; 91; former chairman of the Utah Water Storage Commission who was known as "dean of reclamation" in the western states; 29 Jan.

**SIDNEY Y. WHITE**, Jackson Heights, N. Y.; 55; consulting electrical engineer; 23 Jan.



# W. R. Brode, President Elect

Roger Adams

The choice of Wallace R. Brode as president elect of the American Association for the Advancement of Science in 1957 and as president in 1958 is a welcome recognition of government scientists. Brode is associate director of the National Bureau of Standards in the U.S. Department of Commerce, a position which he has held since 1948.

Although the presidents of the AAAS have been selected primarily by reason of individual distinction in science, the membership has made certain that through the years the broad fields of science have been appropriately represented. In spite of the fact that approximately 25 percent of American scientists are in academic life, 58 percent in industry, and 17 percent directly employed by the government, past presidents have been predominantly from universities. The selection at intervals of suitable candidates from industry and government assures scientists that the equivalent status of workers in all areas is recognized. Of the 110 presidents of the AAAS since its founding in 1848, six have been employees of the Federal Government at the time of their election. Only two of these, however, have been in office since 1888, namely, L. O. Howard (entomology, U.S. Department of Agriculture) 1920, and Charles D. Wolcott (paleontology, Smithsonian Institution) 1923. In addition to being the seventh government scientist, Brode will be the 13th chemist selected as president.

Brode has had the experience and background to fit him for the responsibilities of his new office. He has been a member of the Board of Directors of the American Association for the Advancement of Science for two terms, a member of its Editorial Board, a member of the Association Building Committee, and chairman of the Committee on Revision of the AAAS Constitution and Bylaws.

In addition he has been active in several of the leading scientific societies that are affiliated with the Association. Currently he is a member of the Board of Directors of the American Chemical Society, the Board of Directors of the

Optical Society of America, and the Executive Committee of Sigma Xi. He is chairman of the Board of Governors of the Scientific Research Society of America (RESA) and has served as a member of the Board of Governors of the American Institute of Physics. He has also been a member of both the Chemistry and the Physics Divisional Committees of the National Research Council.

His work at the National Bureau of Standards involves the supervision of its chemical activities as well as those activities of general interest pertaining to education, publication, and foreign relations. In spite of a heavy load of administrative responsibility, he has continued his direction of research and has published many technical papers. Not only is he head of the publication program at the bureau and chairman of its Editorial Committee, but also he has spent 7 years as editor of the *Journal of the Optical Society of America* and is a member of the Publications Board of the American Institute of Physics and of the Publications Committee of the Board of Directors of the American Chemical Society.

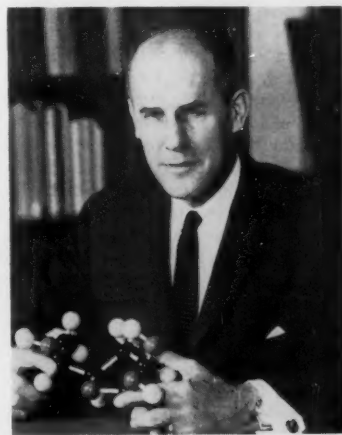
After graduation from Whitman College in 1921, Brode studied for the doctor's degree in organic chemistry at the University of Illinois. Thereafter, he adopted as his special fields of interest stereochemistry and dyes and has established himself as a leader in the field of spectroscopy and applied optics. A combination of synthetic organic chemistry and optical methods of analysis and control has formed the background for most of his research and textbook contributions.

Immediately following his university training, Brode spent 2 years at the National Bureau of Standards and then 2 years as a Guggenheim fellow studying primarily with Hantzsch at Leipzig, Germany, and Baly at Liverpool, England. Upon his return from Europe, he joined the staff at Ohio State University and served as professor of organic chemistry until 1948. In addition to his lectures to elementary and advanced students, he directed the work of some 40 Ph.D. students and created a laboratory and course sequence in chemical spectroscopy.

During World War II (1942-44), Brode supervised a program for the National Defense Research Committee on infrared plastic filters and, in 1944, went to London and later to Paris and Germany. He was head of the Paris Liaison Office of the Office of Scientific Research and Development. In this same period, he was also a member of the "Alsos" mission which had the responsibility of collecting enemy scientific information on nuclear experimentation. He joined the U.S. Naval Ordnance Test Station staff at Inyokern, California, as an associate director in the summer of 1946 to assist in the organization and direction of the Navy's largest rocket research laboratory. He returned to Ohio State University in 1947 but has continued during the succeeding years as a member of the Advisory Board of the Inyokern laboratory.

His papers on optical resolution of asymmetric compounds and in the field of rotating dispersions have been numerous. He has been a leader in devising and producing molecular models to aid in the appreciation of steric effects. They form the background for a sequence of special exercises in an organic laboratory manual written by Brode in collaboration with C. E. Boord and R. G. Bossert. His textbook on chemical spectroscopy pioneered this field and for nearly 20 years has been widely used as a reference in this subject. His investigations involving spectrophotometric measurements and organic synthetic studies of dyes have provided important information on the influence of structure on color and the use of spectrophotometry for prediction of structure.

In recognition of his work in both emission and absorption spectra, he was chosen as the Marburg lecturer of the American Society for Testing Materials in 1950 and served as the first chairman



Wallace R. Brode

Dr. Adams is research professor in the department of chemistry and chemical engineering at the University of Illinois, Urbana.



of the American Society for Testing Materials Committee E-13 on Absorption Spectroscopy. He is currently the chairman of a committee of the National Research Council on the presentation of absorption spectra data. He has recently been chosen as Sigma Xi lecturer and was lecturer in 1956 on the special Perkin centennial program on dyes of the Chemical Society of London. His service during the war on high-level advisory boards for intelligence, defense, and atomic energy activities was recognized by a

Presidential citation. His accomplishments in science resulted in his election to the National Academy of Sciences in 1954 and in the award of an honorary degree of doctor of science by Whitman College in 1955.

Brode is a member of a well-known scientific family. He was one of triplet sons, Malcolm, Wallace, and Robert, of Dr. and Mrs. Howard S. Brode. His father was for 40 years professor of biology at Whitman College in Walla Walla, Washington. His oldest brother, Stanley,

is professor of zoology at the Santa Monica City College in California. Malcolm, who died in 1943, was a professor of zoology at Beloit. Robert is professor of physics at the University of California in Berkeley.

The American Association for the Advancement of Science is to be congratulated on its new president, Wallace R. Brode, a man who by heredity and achievement is eminently qualified to carry on the traditions of the organization.

## AAAS Council Meeting, 1956

Dael Wolfe

The 1956 meeting of the Council of the American Association for the Advancement of Science was held in New York City during the Association's annual meeting. The two sessions were convened at 4 P.M. on 27 Dec. and 9 A.M. on 30 Dec. Paul B. Sears, president of the Association, presided over both sessions. The meeting was the largest in the Association's history, with 156 present at the first session, and 108 at the second.

### Elections and Officers

By mail ballot prior to the meeting, the Council elected Wallace R. Brode as president-elect, and elected Alan T. Waterman and reelected Paul E. Klopsteg to 4-year terms on the Board of Directors. The board announced that it had elected William W. Rubey to serve the unexpired year of Brode's term as a member of the Board of Directors. Also elected by the Council were the vice presidents and chairmen of sections whose names appear on pages 282-283 as part of the complete list of Association officers. By vote of the Council, the Board of Directors was authorized to elect vice presidents and chairmen for those sections whose recommendations had not been received at the time of the meeting.

The Council elected Karl M. Wilbur to a 2-year term on the Nominating Committee.

### Constitution and Bylaws

Upon recommendation of the Committee on Affiliation and Association, the Council voted to abolish the category of associate and to change the status of all societies listed as associates of the AAAS to the status of affiliates. The specific constitutional changes that were voted by Council were (i) to change the title of Article VIII from "Affiliates and Associates" to "Affiliated and Participating Organizations"; (ii) to delete Section 3 of Article VIII; and (iii) to renumber Section 4 of Article VIII as Section 3.

### Resolutions

Upon recommendation of the Interim Committee on the Social Aspects of Science, Council passed the following resolution:

"WHEREAS one of the purposes of the AAAS is 'to improve the effectiveness of science in the promotion of human welfare, and to increase public understanding and appreciation of the importance and promise of the methods of science in human progress'; and whereas the present rapid advance of science is accompanied by social problems of unprecedented magnitude that affect human welfare; therefore be it resolved that in recognition of the responsibility of scientists to participate in deliberations re-

garding the use made of new scientific knowledge, the Council of the AAAS authorizes the president to continue the work of this committee by appointing an enlarged group for the purpose of defining the problems, assembling the relevant facts, and suggesting a practical program, to be submitted to the AAAS Board of Directors, to implement the objectives of the AAAS in this regard."

Upon recommendation of the Committee on Resolutions, Council passed the two following resolutions:

"BE IT RESOLVED that the American Association for the Advancement of Science join with the National Academy of Sciences-National Research Council in the expression of admiration and sympathy for fellow-scientists in Hungary. Be it resolved further that the facilities of the AAAS and its affiliated societies be employed to aid in the placement of refugee Hungarian scientific and technical personnel and to render such other assistance as may be appropriate."

"The Council of the American Association for the Advancement of Science wishes to express its appreciation to the General Chairman and the members of the local committees, and to their institutions and organizations, for the highly effective work that resulted in the successful arrangements for the 123rd annual meeting."

Upon recommendation of the Committee on Resolutions, a resolution requesting the United States National Committee for the International Geophysical Year to seek means of cooperating with biologists in order that biological studies might be better represented in the program of the International Geophysical Year was returned to its authors with the suggestion that the resolution might better be submitted through the American Institute of Biological Sciences.

The Council decided not to endorse a resolution proposed by the Committee on Resolutions that dealt with the freedom of teaching and research and the effects upon such freedom of the large

increases in college and university enrollments and the increased dependence of college and university research budgets on federal funds. Council voted to return the resolution to the committee with a request that it be reconsidered and submitted to the Board of Directors.

## Publications

The chairman of the Board of Directors, George Beadle, reported that the board, the Committee on Publications, the Board of Editors, and the Association's staff had studied the two journals *Science* and *The Scientific Monthly* and the possibility of merging those journals, and that the result of a series of discussions among these groups was the recommendation to merge the two journals into a single one that would retain the format of *Science*. Graham DuShane, editor, explained that the merger would be advantageous in that the editorial staff

could concentrate on a single journal that he expected to be better than either of its predecessors, that the Association would send the same journal to all of its members, and that the wasteful duplication of material that must now be published in both would be avoided. The present character of *The Scientific Monthly*, he explained, would probably be retained in a special monthly issue of the new *Science*. The executive officer, Dael Wolfe, explained that the merger would increase publication costs and decrease revenue, and that the net change in financial position would amount to approximately \$75,000 a year. Eventually, however, the merger should be financially profitable, for the larger circulation of the combined journal would make it a more attractive advertising medium and its improved quality would make it more attractive to prospective members. Because of the financial problems involved, the Board of Directors, in voting to approve the merger, did not

specify the time at which it would become effective, but left the date for later determination.

Upon motion from the floor, Council voted to endorse the proposed merger of *Science* and *The Scientific Monthly*.

With respect to the year's record, the executive officer reported that the circulation of *Science* had increased by 3000 during 1956 and that the circulation of *The Scientific Monthly* had increased by 1400. A substantial portion of these increases was associated with a growth in membership of 2300 during the year. He also reported that DuShane, who had accepted appointment as editor on a trial basis at the beginning of 1956, had decided to remain with the Association on a permanent basis.

## Affiliates

Upon recommendation of the Committee on Affiliation and Association, and with endorsement by the Board of Directors, Council voted to change the status of the American Institute of Biological Sciences from associate to affiliate and to elect the following eight organizations as affiliates: American Geological Institute, American Institute of Physics, Association for Computing Machinery, Cooper Ornithological Society, National Council of Teachers of Mathematics, Operations Research Society of America, Society for Economic Paleontologists and Mineralogists, Tau Beta Pi.

## Other Business

John R. Mayor, director of the Association's Science Teaching Improvement Program, reported on the progress made in efforts to improve the teaching of science and mathematics and described some of the activities of the Science Teaching Improvement Program.

The executive officer reported the loss to the Association of the services of John A. Behnke, formerly associate administrative secretary, who resigned during 1956 to accept appointment as vice president of the Ronald Press Company.

Upon motion made from the floor, Council voted to authorize the Board of Directors to consider ways by which the interest of the past presidents of the AAAS may be maintained and their wisdom and experience utilized to the benefit of the Association.

## Financial Matters

The treasurer, Paul A. Scherer, reported that the Board of Directors had adopted the accompanying budget for the year 1957.

The executive officer reported that preliminary estimates of income and expense figures for 1956 indicated that income would be perhaps \$30,000 above

AAAS Operating Fund Budget, 1957: Receipts

Item	Estimated receipts
Dues of annual members	\$315,000
Journal subscriptions	3,950
Members' special subscriptions	23,000
<i>Science</i> and <i>The Scientific Monthly</i>	
Nonmember subscriptions	
<i>Science</i>	\$ 48,000
<i>The Scientific Monthly</i>	21,000
	69,000
Miscellaneous sales	
<i>Science</i>	1,600
<i>The Scientific Monthly</i>	1,300
	2,900
Advertising	
<i>Science</i>	230,000
<i>The Scientific Monthly</i>	15,000
	245,000
Sale of:	
Microcards	450
Binders	1,600
Symposium volumes	23,000
Emblems	1,600
Other sales	600
	27,250
Meeting	
Registrations and program sales	7,500
Program advertising	2,000
Contributions	5,000
Expositions	
Booth space	11,000
Science library	1,200
	26,700
Rental receipts	22,000
Income from investments	8,000
Cash discounts	400
Other receipts	200
Overhead	16,500
Total receipts	\$759,900

## AAAS Operating Fund Budget, 1957: Expenses

Item	Estimated expenses per item	Estimated expenses (totals)	Limits on individual items
General administrative expenses			
Salaries	\$190,000		\$220,000
Insurance, retirement, and social security	12,850		14,500
Building maintenance	40,780		44,000
Interest on mortgage	7,300		7,400
Office supplies	18,000		20,000
Telephone and telegraph	3,000		3,800
Postage and freight	12,500		13,500
Travel	3,500		5,000
Miscellaneous	9,350		12,800
		\$297,280	
Printing and manufacturing			
Science	260,000		275,000
The Scientific Monthly	63,000		66,000
Symposium volumes	22,000		27,000
Binders	1,200		1,500
Microcards	280		350
Emblems	500		1,200
		346,980	
Annual meeting			
Meeting and exposition	19,000		21,000
Press service	5,000		5,500
		24,000	
Sections, divisions, board, and committees			
Section expense	5,000		5,800
Division allowance	7,900		8,300
Board of directors	6,000		6,500
Editorial board	9,000		10,000
Other committees	5,000		6,000
		32,900	
Depreciation			
Building	23,200		
Furniture and equipment	6,000		
		29,200	
Advertising		54,000	64,000
Miscellaneous		300	
Executive officer's discretionary fund		5,000	
Contingencies and new activities		10,000	
Total operating expenses		\$799,660	

## AAAS Officers, Committees, and Representatives for 1957

Following are the officers, committee members, and representatives of the American Association for the Advancement of Science. (Dates in parentheses indicate year of expiration of term.)

President: Laurence H. Snyder (1958), University of Oklahoma  
 President Elect: Wallace R. Brode (1959), National Bureau of Standards  
 Retiring President and Chairman of

the budgeted amount and that expenses would be in the neighborhood of \$13,000 less than the budgeted amount. Income and expense for 1956 are expected to be in approximate balance. He also reported receipt during 1956 of the following gifts and grants:

\$100,000 from the Carnegie Corporation of New York as the second year's portion of a \$300,000 grant for a 3-year period to support the Association's Science Teaching Improvement Program;

\$6000 from the Carnegie Corporation of New York to support a conference on the teaching of mathematics;

\$65,000 from the National Science Foundation to support the Traveling Science Libraries;

\$10,000 from the National Science Foundation for the Gordon Research Conferences for the purpose of bringing distinguished scientists from other countries to attend these conferences;

\$5000 from members and friends as contributions to the Association's building fund;

\$12,000 from the General Electric Educational and Charitable Foundation to aid in the Association's Science Teaching Improvement Program;

Approximately \$14,000 from the estate of Margaret Young Smith;

\$450 from C. M. Goethe of Sacramento, California.

The board reported that in compliance with a request made by the Council at its 1955 meeting, the question of assessing all affiliates \$25 per year per Council member, in order to raise a fund from which Council members attending a meeting could be partially reimbursed for their traveling expenses, had been discussed with all affiliated societies. Since the reaction to the proposal had been predominantly negative, the board recommended that no further action be taken on the proposal. No action was taken.

the Board of Directors: Paul B. Sears (1957), Yale University

### Other Members of the Board of Directors

Thomas Park (1957), University of Chicago

William W. Rubey (1957), U.S. Geological Survey, Washington, D.C.

Chauncey D. Leake (1958), Ohio State University

Margaret Mead (1958), American Museum of Natural History

Paul M. Gross (1959), Duke University

George R. Harrison (1959), Massachusetts Institute of Technology

Paul E. Klopsteg (1960), Glenview, Ill.

Alan T. Waterman (1960), National Science Foundation  
 Paul A. Scherer (ex officio), Carnegie Institution of Washington  
 Dael Wolfe (ex officio), AAAS

#### Vice Presidents and Chairmen of the Sections

*A* Mathematics: A. W. Tucker, Princeton University  
*B* Physics: Raymond T. Birge, University of California, Berkeley  
*C* Chemistry: F. E. Cislak, Reilly Tar & Chemical Corp., Indianapolis, Ind.  
*D* Astronomy: C. B. Watts, U.S. Naval Observatory, Washington, D.C.  
*E* Geology and Geography: Robert R. Shrock, Massachusetts Institute of Technology  
*F* Zoological Sciences: E. Raymond Hall, University of Kansas  
*G* Botanical Sciences: Harry J. Fuller, University of Illinois  
*H* Anthropology: Leslie White, University of Michigan  
*I* Psychology: Neal Miller, Yale University  
*K* Social and Economic Sciences: Stuart A. Rice, Falls Church, Va.  
*L* History and Philosophy of Science: I. Bernard Cohen, Harvard University  
*M* Engineering: Clarence E. Davies, American Society of Mechanical Engineers  
*N* Medical Sciences: William B. Bean, State University of Iowa  
*Nd* Dentistry: Isaac Schour, University of Illinois  
*Np* Pharmacy: Robert C. Anderson, Eli Lilly and Co., Indianapolis, Ind.  
*O* Agriculture: L. P. Reitz, Agricultural Research Service, Beltsville, Md.  
*P* Industrial Science: Frank C. Croxton, Battelle Memorial Institute, Columbus, Ohio  
*Q* Education: Arthur E. Traxler, Educational Records Bureau, New York, N.Y.

#### Administrative Officers

##### Appointed by the Board of Directors

Executive Officer: Dael Wolfe  
 Treasurer: Paul A. Scherer  
 Associate Administrative Secretary: Raymond L. Taylor  
 Editor: Graham DuShane

##### Secretaries of the Sections

*A* Mathematics: C. C. MacDuffee (1960), University of Wisconsin  
*B* Physics: J. Howard McMillen (1959), National Science Foundation  
*C* Chemistry: Edward F. Degering (1960), QM Research & Development Center, Natick, Mass.  
*D* Astronomy: Frank K. Edmondson (1957), Goethe Link Observatory, Indiana University



William W. Rubey, research geologist at the U.S. Geological Survey, Washington, D.C., is a new member of the AAAS board of directors.

*E* Geology and Geography: Frank C. Whitmore, Jr. (1960), U.S. Geological Survey, Washington, D.C.  
*F* Zoological Sciences: Harold H. Plough (1959), Amherst College  
*G* Botanical Sciences: Barry Commoner (1959), Washington University, St. Louis  
*H* Anthropology: Gabriel W. Lasker (1957), Wayne State University College of Medicine  
*I* Psychology: Clifford T. Morgan (1960), Johns Hopkins University  
*K* Social and Economic Sciences: Donald P. Ray (1958), George Washington University  
*L* History and Philosophy of Science: Jane M. Oppenheimer (1958), Bryn Mawr College  
*M* Engineering: E. Paul Lange (1960), Engineers Joint Council, New York, N.Y.  
*N* Medical Sciences: Allan D. Bass (1960), Vanderbilt University School of Medicine  
*Nd* Dentistry: Russell W. Bunting (1958), University of Michigan School of Dentistry  
*Np* Pharmacy: John E. Christian (1958), Purdue University School of Pharmacy  
*O* Agriculture: Karl S. Quisenberry (1957), U.S. Department of Agriculture, Washington, D.C.  
*P* Industrial Science: Allen T. Bonnell (1960), Drexel Institute of Technology  
*Q* Education: Herbert A. Smith (1959), University of Kansas

#### Officers of the Pacific Division

President: J. Murray Luck, Stanford University  
 President Elect: Ian Campbell, California Institute of Technology

Retiring President: Robert B. Brode, University of California, Berkeley  
 Secretary: Robert C. Miller, California Academy of Sciences  
 Council Representative: Robert C. Miller

#### Officers of the Southwestern and Rocky Mountain Division

President: Marlowe G. Anderson, New Mexico College of Agriculture and Mechanic Arts  
 Vice President: M. F. Stubbs, New Mexico Institute of Mining & Technology  
 Executive Secretary: Frank E. E. Germann, University of Colorado  
 Council Representative: Marlowe G. Anderson

#### Officers of the Alaska Division

President: Victor P. Hessler, University of Alaska  
 Vice President: Frank Pauls, Territorial Department of Health, Anchorage  
 Secretary: Clyde J. Beers, U.S. Coast and Geodetic Survey, College  
 Council Representative: C. T. Elvey, Geophysical Institute, University of Alaska

#### Editorial Board

Graham DuShane, chairman  
 Wallace R. Brode, National Bureau of Standards  
 Bentley Glass, Johns Hopkins University  
 Karl Lark-Horovitz, Purdue University  
 Edwin M. Lerner, National Institutes of Health  
 William L. Straus, Jr., Johns Hopkins University  
 Charlotte V. Meeting, ex officio

#### Standing Committees

##### Affiliation

I. Melville Stein (1957), Leeds & Northrup Company, Philadelphia, Pa., chairman  
 John B. Buck (1958), National Institutes of Health  
 Herbert Carter (1959), University of Illinois  
 Luna Leopold (1960), U.S. Geological Survey, Washington, D.C.  
 Earl L. Green (1961), Jackson Memorial Laboratory, Bar Harbor, Me.  
 Dael Wolfe, ex officio  
 Raymond L. Taylor, staff representative

##### AAAS Meetings

Harry C. Kelly (1957), National Science Foundation, chairman  
 F. E. Cislak (1957), Reilly Tar and Chemical Corp., Indianapolis  
 Frank K. Edmondson (1957), Indiana University





Alan T. Waterman, director of the National Science Foundation, with offices in Washington, D.C., is a new member of the AAAS board of directors.

Howard M. Phillips (1958), Emory University  
 Arthur W. Galston (1959), Yale University  
 Dael Wolfe, ex officio  
 Raymond L. Taylor, staff representative

#### *Executive Committee of the Board of Directors*

Paul B. Sears, chairman  
 Laurence H. Snyder  
 Wallace R. Brode  
 Paul E. Klopsteg  
 Paul A. Scherer  
 Dael Wolfe

#### *Investment and Finance*

F. P. H. Siddons (1957), American Security & Trust Company, Washington, D.C., chairman  
 Malvern F. Morse (1958), American Security & Trust Company  
 Wallace R. Brode (1959), National Bureau of Standards  
 J. E. Graf (1960), Smithsonian Institution  
 Sheldon B. Akers (1961), Brookings Institution  
 Paul A. Scherer, ex officio  
 Dael Wolfe, ex officio  
 Hans Nussbaum, staff representative

#### *Nominations*

Margaret Mead (1957), American Museum of Natural History, chairman  
 Marsh W. White (1957), Pennsylvania State University  
 A. Nelson Sayre (1957), U.S. Geological Survey, Washington, D.C.  
 Milton O. Lee (1957), Federation of American Societies for Experimental Biology  
 Wallace R. Brode (1958), National Bureau of Standards  
 Karl M. Wilbur (1958), Duke University

#### *Publications*

Thomas Park (1957), University of Chicago, chairman  
 Ralph R. Shaw (1958), Rutgers University  
 Chauncey D. Leake (1959), Ohio State University  
 George R. Harrison (1960), Massachusetts Institute of Technology  
 Paul M. Gross (1961), Duke University  
 Dael Wolfe, ex officio  
 Graham DuShane, staff representative

#### *Special Committees*

##### *AAAS-Anne Frankel Rosenthal Memorial Award for Cancer Research, Judges*

Warren Weaver, Rockefeller Foundation, chairman  
 Harry S. N. Greene (American Association for Cancer Research), Yale University School of Medicine  
 G. Burroughs Mider, National Cancer Institute  
 Richard L. Rosenthal, Richard and Hinda Rosenthal Foundation  
 C. Chester Stock, Sloan-Kettering Institute for Cancer Research  
 Harry M. Weaver, American Cancer Society

##### *AAAS-Ida B. Gould Memorial Award for Research on Cardiovascular Problems, Judges*

Paul Dudley White, Boston, Mass., chairman  
 C. Sidney Burwell (Helen Hay Whitney Foundation), Harvard Medical School  
 Robert P. Glover (American College of Cardiology), Presbyterian Hospital, Philadelphia  
 Dickinson W. Richards (Life Insurance Medical Research Fund) Bellevue Hospital, New York  
 Richard L. Rosenthal, Richard and Hinda Rosenthal Foundation  
 Francis C. Wood (American Heart Association), University of Pennsylvania Hospital  
 J. Franklin Yeager (National Heart Institute), National Heart Institute

##### *AAAS Research Grants*

Barry Commoner, Washington University, chairman  
 E. Lowell Kelly, University of Michigan  
 Hans Nussbaum, AAAS  
 Laurence H. Snyder, University of Oklahoma  
 H. Burr Steinbach, University of Chicago  
 Dael Wolfe, staff representative

##### *AAAS Socio-Psychological Prize*

Donald P. Ray, George Washington University  
 Stuart A. Rice, Falls Church, Va.  
 Dael Wolfe, AAAS

##### *Interim Committee on the Social Aspects of Science for 1956*

Ward Pigman, University of Alabama Medical Center, chairman  
 Barry Commoner, Washington University  
 Gabriel W. Lasker, Wayne State University  
 Chauncey D. Leake, Ohio State University  
 Benjamin H. Williams, Industrial College of the Armed Forces

##### *Management and Business Operations*

Mark H. Ingraham, University of Wisconsin, chairman  
 George J. Beal, Rockefeller Foundation (retired)  
 F. P. H. Siddons, American Security & Trust Company  
 Paul A. Scherer, ex officio  
 Dael Wolfe, ex officio

##### *Popular Science Books*

Harrison Brown, California Institute of Technology  
 Barry Commoner, Washington University  
 E. U. Condon, Washington University  
 Kirtley F. Mather, Harvard University  
 Dael Wolfe, ex officio

##### *Resolutions for 1956*

W. George Parks, University of Rhode Island, chairman  
 Orr E. Reynolds, Office of Naval Research, Washington, D.C.  
 Kenneth C. Spengler, American Meteorological Society, Boston

##### *Retirement Plan (must be composed of three staff members)*

Dael Wolfe, chairman  
 Hans Nussbaum  
 Raymond L. Taylor

##### *Source Books in the History of Science*

Gregory D. Walcott, Long Island University, chairman  
 Harlow Shapley, Harvard University  
 Edmund W. Sinnott, Yale University

#### *Committees To Be Appointed*

AAAS Newcomb Cleveland Prize, Judges  
 AAAS Socio-Psychological Prize, Judges  
 Theobald Smith Award in the Medical Sciences, Judges

#### *Representatives on*

*AAAS Cooperative Committee on the Teaching of Science and Mathematics (representative of the Board of Directors)*

Alfred B. Garrett, Ohio State University

*Advisory Council on Medical Education*  
Lowell T. Coggeshall, University of Chicago

*American Council on Education*  
Mark H. Ingraham, University of Wisconsin  
John R. Mayor, AAAS

*Committee on the Kimber Genetics Award of the National Academy of Sciences*  
I. Michael Lerner, University of California, Berkeley

*Council of National Organizations of the Adult Education Association of the United States*  
John A. Behnke, Ronald Press Company, New York

*Council of Old World Archeology*  
Richard K. Beardsley, University of Michigan

*National Committee for UNESCO*  
To be appointed

*Joint Commission on Mental Illness and Health*

Ernst Mayr, Museum of Comparative Zoology, Harvard University

*National Conference on FAO*  
Noble Clark, University of Wisconsin

*Science Service Board of Trustees*  
Paul B. Sears (1957), Yale University  
Karl Lark-Horovitz (1958), Purdue University  
William W. Rubey (1959), U.S. Geological Survey, Washington, D.C.

*Scientific Manpower Commission*  
Detlev W. Bronk, Rockefeller Institute for Medical Research  
(Wallace R. Brode, alternate)  
Dael Wolfe, AAAS

*U.S. Committee on ISO Technical Committee 37—Terminology*  
Duane Roller, Ramo-Wooldridge Corporation

## AAAS Membership

1) <i>Changes during 1956</i>	
New members	6,626
Losses	
Deaths	241
Resignations	1,453
Automatic resignations	2,403
Total loss	4,097
Net increase during 1956	2,529
2) <i>Totals as of 31 Dec. 1956</i>	
Paid for 1956	33,127
Paid through March 1957	1,358
Paid through June 1957	12,926
Paid through Sept. 1957	929
Life members, etc.	863
In good standing	49,203
In arrears	2,491
	51,694
New for 1957	1,024
Total membership	52,718

# New York Meeting in Retrospect

Raymond L. Taylor

No two scientific meetings are ever alike, not even two consecutive annual conventions of the same society or two meetings of the same organization in the same locale. This generalization is particularly obvious with the large-scale, diversified annual meetings of the American Association for the Advancement of Science, which, uniquely, bring together scientists of all the principal disciplines, research directors, academic administrators, teachers, students, writers, editors, more than one philosopher, and an increasing number of science-minded members of all the major professions. Inevitably, old friends are seen and new friends are made; ideas are engendered and expressed; discussions planned and unplanned occur; concepts are sharpened; and lasting impressions may be received. The great majority of those who attended return to their laboratories, classrooms, and offices stimulated

to further work and thought. Thus, the real measure of the success of any scientific meeting would be the sum total of the effects of this commingling of trained minds, the journal articles and symposium volumes which ensue, the new directions of research taken, and the increase in vigor with which long-standing problems are reattacked. If so, the full impact of any AAAS meeting comes in subsequent years—and scarcely can be completely evaluated either immediately afterward or later.

Some indication of the significance of a particular meeting, however, is available in the number and identity of those who attend and in the quality of the programs which attract them. Not infrequently, actions are taken in the business sessions which are important milestones or turning points. In significance, thus suggested, the Association's seventh New York meeting, 26–30 Dec. 1956, may

prove to have been one of its greatest. The two sessions of the AAAS Council are reported on other pages of this issue, and the caliber of the many programs is apparent in the General Program-Directory and in the appended reports of the sections and participating societies.

There were 5327 registrants. Characteristic of all AAAS meetings, the Visible Directory of Registrants included representatives from all sections of the continent and an impressive group of top-level investigators, Nobel prize winners, and high-ranking research administrators.

Usually the annual meetings of the Association, set for the six days between Christmas and New Year's, do not have many sessions earlier than the morning of 27 Dec., and the programs extend into the morning of 31 Dec. This year, however, because of the four-day holiday, on Sat., 29 Dec., through Tuesday, 1 Jan., the meeting was skewed. It opened almost full-scale on the morning of 26 Dec. and, by the afternoon of that day, nearly every section and participating society had begun its sessions. Conversely, 30 Dec., a Sunday, was lighter than the four preceding days, and there were no sessions at all on 31 Dec. Despite the compression of some 357 sessions in five days and four evenings, conflicts between sessions appealing to the same audiences were at a minimum.

In summary, this annual meeting of the Association for 1956 was particularly well attended, well balanced, and memorable, and there were numerous spon-

taneous complimentary remarks on the excellent general "tone." When the various aspects are considered, it is clear that the meeting was decidedly successful in most essential respects.

### Arrangements for the Meeting

The decision to meet again in New York, after an interval of 7 years, was made by the AAAS board of directors at its June meeting in 1952, when it was logical that the Association again meet in the East and the success of the 1949 New York meeting was a recent memory.

Those who attend a large scientific meeting, unless they have shared in making some of the arrangements, may not appreciate the amount of planning and work that eventually result in several hundred sessions, most of them requiring one or more types of projection equipment. The cooperation and services of a great many individuals are essential. Usually, an experienced convention bureau will operate a housing bureau and provide registration personnel, but everything else must be arranged by the sponsoring organization. Local committees must be set up, preferably in the preceding year.

This has been the pattern of AAAS meetings in the postwar years. Early each spring the secretary of each section and participating society is asked to estimate the probable number of sessions and his best guess of the probable attendance at each. It is easy to over- or underestimate when, at this stage, the programs are still far from complete, and calls for papers may not have gone out. Soon afterward, on the basis of session-room requirements and preferences, the headquarters hotels for related sections and societies are selected.

In New York, the large Entomological Society of America utilized the relatively limited number of public rooms of the Hotel New Yorker and, in the interest of a compact and convenient meeting, as many sessions as possible were scheduled in the remaining Penn Zone hotels—Statler, Governor Clinton, Sheraton-McAlpin, and Martinique. Related groups of societies and sections, especially when there were interdisciplinary programs planned, were assigned to the hotel that could best meet their needs. The intensive use of the Statler, AAAS headquarters, for instance, necessitated the simultaneous use of the three divisions of the Penn Top—not an ideal arrangement but satisfactory when the folding partitions are fully closed and the microphone in the largest room kept at a moderate pitch (speakers do not always adjust the height of the instrument or face it).

Most of the local scientific organiza-

tions and a number of the educational institutions made their facilities available for sessions. The AAAS gratefully acknowledges these. The American Astronomical Society held its sessions at the Hayden Planetarium, Roosevelt Hall of the American Museum of Natural History, and the Henry Hudson Hotel. The American Museum of Natural History was also the site of an excellent informative symposium on museum techniques and demonstrations of exhibit preparations, sponsored by the museum and arranged by Gordon Reekie of the staff; of the sessions of the Society of Vertebrate Zoology; and of the tenth annual Junior Scientists Assembly, sponsored jointly by the Academy Conference and the AAAS as a whole. (This program, designed to encourage selected high-school students who are considering careers in science, is reported elsewhere by Zachariah Subarsky, program chairman.) Two societies had special tours of the museum, and doubtless numerous individuals among the attendance visited it.

The New York Academy of Science's two-session symposium, "Modern ideas on spontaneous generation," joint with AAAS Section F, was held at the Hotel Barbizon-Plaza; a joint symposium with the Ecological Society of America, "Values in human ecology," was held in the academy's auditorium and was followed by a luncheon. The Cornell University Medical College was the locale of the program of Alpha Epsilon Delta; there were dinners at the faculty clubs of Columbia and New York Universities; Alpha Chi Sigma greeted visiting chemists at the Chemists' Club; and the silver anniversary celebration of the Gordon Research Conferences was held at the Hotel Commodore. The New York Botanical Garden arranged an open house 26 Dec., and the New York Zoological Society-Bronx Zoo had daily guided tours 27-31 Dec. for zoologists and other interested scientists. The Museum of Modern Art lowered its entrance price to accommodate all AAAS registrants.

The local Committee on Physical Arrangements always has one of the most taxing assignments. Commonly, more than 200 sessions will require projection, often with two or more types per session. Lanterns must be assembled, determined as suitable for the size of the room and the session in each case, tagged with respect to both source and session room, transported to the hotels, checked in and out of each storage room, repaired, supplied with spare lamps, and the like. Personnel must be engaged both to deliver and to operate the equipment.

In New York, with very few exceptions, all projection equipment was lent by the Audio Visual Department of New York City's five-borough Board of Education. The number of lanterns moved

into each of the five hotels on 20 Dec., the last "working day" before the first day of the meeting, was based on the projection requirement forms that had been returned to the Washington office of the Association by most, but not all, of the program chairmen. Some "extras" were provided in anticipation of last-minute requests for projection—but such requests, more numerous than usual, did tax the supply in several of the audio visual "centers" established in each hotel. In general, the lanterns were distributed and collected by technicians employed in the school system who volunteered their services, but there were instances where impatient presiding officers helped themselves, got lanterns intended for other rooms, and thus caused temporary shortages. An extreme instance was the report that one chairman took three lanterns which he planned to operate *seriatim*, and thus save several seconds per slide.

Despite the difficulties mentioned, the Committee on Physical Arrangements did a generally excellent job and all concerned are deeply indebted to the many who served without pay and, in particular, to the cochairmen, Samuel Schenberg, supervisor of science, Board of Education, who was present throughout the five days to direct operations, and Edward G. Bernard, director of visual instruction in the city's school system. Thanks are also due to the many program chairmen who arranged for volunteer operators from their attendance and to the operators themselves. The services rendered were substantial. For those instances where the audiences were inconvenienced, sincere regrets and apologies are expressed.

Besides some temporary shortages of lanterns and screens, the causes of which were various, other unforeseen incidents occurred which also inconvenienced the session chairmen, speakers, and the audiences concerned. For the first time in 15 years, on one morning of the meeting period, the New York Statler suffered from "cold mikes." The explanation: All PA systems in that hotel are operated from a central control room and usually only the two assigned engineers are familiar with the maze of switches and pilot lights. On the morning in question, Engineer A telephoned in that he could not report for duty because his child was sick; Engineer B, commuting into work would have been there on time if the train he was on had not hit an automobile and been delayed some 45 minutes. Eventually, the top management of the hotel got every microphone in operation by the simple expedient of throwing every switch in sight.

On the last afternoon of the meeting, at one hotel, an important program did not conclude at 5 P.M. as the hotel man-



Officers of the AAAS admire the large relief globe of the world loaned by *Look* Magazine and the geology department of Columbia University. Left to right: Paul B. Sears, Dael Wolfe, Wallace R. Brode, Laurence H. Snyder, and George Beadle.

agement had anticipated. The hotel owner's daughter's wedding reception was scheduled for 8 P.M. in that room. In their zeal, the workmen setting up for the reception disconnected the lantern at 5 P.M. and at 5:30 P.M. insisted that the meeting end then, although another 15 minutes would have accommodated the final speaker. For this unhappy incident, which never should have happened, only regret can be expressed at this time, to all those affected.

In the absence of other reports, it is believed that most of the 357 sessions did find that the arrangements made for them were satisfactory.

### Highlights of the Meeting

The seventh New York meeting enjoyed an unusual number of events which will stand out in the memories of those who attended them. Included were the two-session AAAS general symposium, "Moving frontiers of science," four commemorative programs, and the special evening sessions.

The commemorative programs were (i) a symposium, "Commemorating the 100th anniversary of the discovery of Neanderthal man," a joint program of AAAS Section H (Anthropology) and the American Institute of Human Paleontology, arranged by Loren C. Eiseley and William L. Straus, Jr.; (ii) a sym-

posium, "The general significance of the work of Freud," commemorating the centennial of his birth, a joint program of AAAS Section L (History and Philosophy of Science) and the American Philosophical Association, Eastern Division, cosponsored by the Philosophy of Science Association, arranged by John Wild and Jane M. Oppenheimer; (iii) a Botanists' Dinner and vice-presidential address, sponsored by AAAS Section G (Botanical Sciences), in celebration of the 50th anniversary of the founding of the Botanical Society of America; and (iv) the 25th anniversary dinner of the Gordon Research Conferences, a participating organization of the AAAS, at which Glenn T. Seaborg spoke on "The future through science."

The special evening sessions included, on 27 Dec., a joint annual address of the Society of the Sigma Xi and the Scientific Research Society of America, "Science, technology, and society," delivered by Lawrence R. Hafstad, who received the William Procter prize of RESA; and the 17th annual address of the United Chapters of Phi Beta Kappa with the AAAS, "Toward more vivid utopias," given by Margaret Mead.

The concluding special session, 29 Dec., was a first showing of the National Geographic Society's film, *Southeast Asia's Golden Pageantry* and lecture by W. Robert Moore, chief of the foreign editorial staff of the society. This annual

lecture with the AAAS, appreciated by all, was cooperatively scheduled for 7 P.M. so that the AAAS Smoker could follow in the same and adjacent rooms.

### AAAS Presidential Address and Reception

On the customary evening, 28 Dec., the traditional address by the retiring, 108th president of the Association, George W. Beadle, was given before an audience which overflowed the capacious ballroom of the Hotel Statler. AAAS president, Paul B. Sears, presided and introduced each speaker with appropriate remarks. Eugene Holman, president of Standard Oil Company (New Jersey) and general chairman of the seventh New York meeting, on behalf of the local committees, graciously welcomed the Association and the audience to New York and, as a petroleum geologist now an administrator, he was particularly competent to point out briefly the interdependence of science and industry.

Richard L. Rosenthal, in announcing the winners of the second AAAS-Anne Frankel Rosenthal Memorial Award for Cancer Research and the first AAAS-Ida B. Gould Award for Research on Cardiovascular Problems, explained the purposes of these awards which are financed by the Richard and Hinda Rosenthal Foundation. President Sears, after a brief



Table 1. Analysis of sessions at seventh New York meeting.

Sessions for symposia, invited papers, and panels	133
Sessions for contributed papers	63
Sessions with addresses or lectures	38
Business sessions	54
Meal or social functions	46
Tours and field trips	9
Sessions for motion pictures	14
Total number of sessions	357

tribute to a distinguished scientific career in biology and genetics, then introduced the principal speaker of the evening.

George W. Beadle's thought-provoking address, "The uniqueness of man" [*Science* 125, 9 (4 Jan. 1957)] sketched the origin of the cosmos, outlined some of the probabilities of chemical and organic evolution which had culminated in the one species, man, uniquely able, to a considerable extent, to control or modify his environment—and now with the capacity to destroy all life. Discussing the increasing dangers of rising populations, consumption of raw materials and food, the need for new sources of energy, and the necessity to abolish war, he concluded by pointing out that not only knowledge but wisdom, courage, and faith are essential if man is to realize the still greater achievements that are possible.

The AAAS reception which followed was well attended and, for those in the receiving line, it was a pleasure to greet so many members and friends of the Association.

### AAAS General Symposium

Fundamental units and concepts of science was the topic of a general symposium held on the afternoons of 27 and 28 Dec. The symposium, which was arranged by the Committee on AAAS Meetings, consisted of a lively interchange of sometimes sharply contrasting views on the nature and role of theories in different areas of science.

On the first afternoon, papers were presented by Robert MacLeod (social sciences), Ralph W. Gerard (biological sciences), and Jerrold R. Zacharias (physical sciences). The papers were discussed, in order, by Paul F. Lazarsfeld, Paul Weiss, and Jerome B. Weisner. The second afternoon opened with a paper by Michael Polanyi and concluded with a panel discussion among all of the participants. Howard Mumford Jones served as moderator for both sessions.

### Other Symposia

The trend toward a large number of symposia at AAAS meetings continued,

not only among the sections of the Association, but also among the participating societies. As Table 1 shows, there were 133 symposia, panels, groups of invited papers, or other sessions centered about a particular theme. At the seventh New York meeting there were about twice as many sessions devoted to programs of this type than to sessions for contributed papers, although 12 societies, one of them quite large, were holding their national meetings with the Association. As is shown in Table 2, the participating societies, especially the 41 which arranged special meetings, in the aggregate had almost as many sessions of this type as the AAAS and its 18 sections. The 640 symposium participants outnumbered the 542 other speakers.

Among the 133 symposia, the following were noteworthy for their interdisciplinary scope: "Chemical and biological aspects of cellular competition," sponsored by AAAS Section C (Chemistry), co-sponsored by the American Society of Naturalists and the Society of General Physiologists, arranged by Werner Braun; "Recent advances in geochronometry," sponsored by AAAS Section E (Geology and Geography), cosponsored by the Geological Society of America, the American Geophysical Union, and, in part, Sections F, G, and H, arranged by J. Laurence Kulp; "Modern ideas on spontaneous generation," a joint program of the New York Academy of Sciences and AAAS Section F (Zoological Sciences), cosponsored by AAAS Section G (Botanical Sciences), arranged by a committee, Ross F. Nigrelli, chairman; "Biochemistry of the cell nucleus," sponsored by AAAS Section F, cosponsored by Section G and the Genetics Society of America, arranged by Arthur W. Pollister; "Problems of aging," a joint program of AAAS Sections F, G, and I (Psychology) and the American Society of Zoologists, sponsored by the U.S. Atomic Energy Commission through the Brookhaven National Laboratory, arranged by H. J. Curtis, Paul J. Kramer, and Conrad G. Mueller; "Some unsolved problems in

biology," sponsored by Section G and co-sponsored by Section F and the Botanical Society of America; "Biotic communities in the past and today," a program of the Society for the Study of Evolution, co-sponsored by the Society of Vertebrate Paleontologists and the American Society of Naturalists, arranged by Harlan Lewis; "The impact of natural science on social science," a joint session of Section K (Social and Economic Sciences), the National Academy of Economics and Political Science, and the American Political Science Association, arranged by Donald P. Ray; "Science and ethics," sponsored by AAAS Section L (History and Philosophy of Science) and the Philosophy of Science Association, arranged by Joseph Mayer; "Evolution of nervous control from primitive organisms to man," the four-session symposium of AAAS Section N (Medical Sciences), arranged by Bernard B. Brodie; "Aids for environmental control," sponsored by AAAS Section M (Engineering), cosponsored by AAAS Sections C, H, I, K, L, and N, and the Conference on Scientific Manpower, arranged by Eugene F. Murphy and Irving P. Orens; "Antienzymes," a joint program of AAAS Sections Nd (Dentistry), C, N, and Np (Pharmacy), arranged by George C. Paffenbarger, Ed. F. Degering, Allan D. Bass, and John E. Christian; and "Grasslands in our national life," sponsored by AAAS Section O (Agriculture), cosponsored by AAAS Sections G and K and 17 societies, endorsed by 11 other organizations, arranged by Howard B. Sprague. The Association expresses its deep appreciation to the 640 persons who prepared papers for these and the other, more specialized symposia.

### Conferences

All of the three recurrent conferences at AAAS meetings had programs. The Academy Conference, composed of the official delegates of the 41 academies of science affiliated with the Association and

Table 2. Comparison of AAAS-sectional and societal programs.

Item	AAAS, its sections, and conferences	Participating societies	Total number of sessions with papers	Total number of papers
Sessions for symposia, invited papers, and panels	69 (326 papers)	64 (314 papers)	133	640
Sessions for contributed papers	21 (138 papers)	42 (346 papers)	63	484
Sessions for addresses and lectures	16 (27 speakers)	22 (31 speakers)	38	58
Total			234	1082

others interested in academy affairs, had a day and a half of sessions culminating in a dinner at which Father Patrick H. Yancey gave the Academy Conference presidential address.

The program of the Conference on Scientific Manpower, which was arranged by a committee headed by Thomas J. Mills and cosponsored by the Engineering Manpower Commission, the Scientific Manpower Commission, the National Research Council, the National Science Foundation, and AAAS Section M (Engineering), was concerned with the program of the National Committee for the Development of Scientists and Engineers and its implications for the physical sciences, for engineering, and for the life sciences.

The Conference on Scientific Editorial Problems, the program chairman of which was J. G. Adashko, had six well-attended sessions. One of these was cosponsored by the Technical Publishing Society and another by the Association of Technical Writers and Editors; members of these organizations contributed to the attendance and participated in the discussions.

#### AAAS Business Sessions

As is required by the constitution, the Association's board of directors held its fourth regular meeting of the year at the annual meeting; as usual, its sessions preceded the two sessions of the Council, 27 and 30 Dec., which are reported elsewhere. It is gratifying that these sessions, especially the one on 27 Dec., with 157 members present, were well above the attendance of previous years. The AAAS section officers' luncheon and business meeting held on 29 Dec. was well attended. There was helpful discussion on the tentative plans for the Indianapolis meeting.

#### Attendance

In sheer size, with 5327 registrants, the seventh New York meeting was the second largest in the 108-year history of the Association, exceeded only by the previous New York meeting of 1949—when a record-breaking number of large societies held their national meetings with the AAAS. (In number of registrations, the seven largest AAAS meetings have been: New York, 1949—7014; New York, 1956—5327; Chicago, 1947—4940; Washington, 1924—4206; New York, 1928—3925; Berkeley, 1954—3856; and Philadelphia, 1951—3702. To date, only 11 of the 123 AAAS meetings have exceeded 3000 registrants.) It is always true that the total attendance of professional scientists, faculty members, other teachers, and graduate stu-

Table 3. Distribution of registrants by states and countries.

Alabama	8	Texas	37
Arizona	5	Utah	9
Arkansas	4	Vermont	12
California	97	Virginia	98
Colorado	18	Washington	10
Connecticut	215	West Virginia	8
Delaware	52	Wisconsin	50
District of Columbia	199	Wyoming	3
Florida	42		
Georgia	28	Total, continental U.S.	5220
Idaho	2		
Illinois	137	Alaska	2
Indiana	60	Australia	2
Iowa	30	Austria	1
Kansas	20	Brazil	5
Kentucky	19	Canada	59
Louisiana	37	Colombia	1
Maine	14	Denmark	1
Maryland	243	England	1
Massachusetts	260	France	1
Michigan	109	Germany	1
Minnesota	28	Hawaii	3
Mississippi	4	Honduras	1
Missouri	30	India	6
Montana	8	Italy	1
Nebraska	13	Jamaica	1
New Hampshire	24	Japan	2
New Jersey	638	Liberia	2
New Mexico	6	Mexico	3
New York		Monaco	1
Upstate	321	Nepal	1
Suburban	341	New Zealand	1
New York City	1365	Panama	1
North Carolina	40	Philippines	1
North Dakota	6	Puerto Rico	3
Ohio	140	Saudi Arabia	1
Oklahoma	5	Spain	1
Oregon	6	Sweden	2
Pennsylvania	330	Taiwan	2
Rhode Island	27		
South Carolina	17	Total, territorial and foreign	107
South Dakota	2		
Tennessee	43	Total registrations	5327

dents at any national meeting of the Association is always greater than the number of registrations, since all programs are open to everyone. Some register only with their societies, apparently regarding a "double registration" as superfluous or onerous. Finally, there are commonly several thousands of the science-minded general public who attend the evening lectures or some one event who do not register at all. At New York it is probable that an additional 10,000 attended one or more of the 357 sessions or visited the Annual Exposition of Science and Industry, the 70 exhibitors of which filled 92 booths.

Hotel room reservations and especially advance registrations had suggested a larger-than-usual meeting, but it was not until after the heavy registrations of the first two days that it became probable that this 123rd AAAS meeting would surpass the 1947 meeting in Chicago when, as in 1949, so many large societies met with the AAAS.

As Table 3 shows, slightly less than one-third of the total registration came

from New York City and suburbs—the nation's most populous educational and scientific center; approximately one-eighth came from nearby New Jersey and Connecticut; and the remainder, about 56 percent, came from a substantial distance—upstate New York, the other 47 states (with the sole exception of Nevada), the District of Columbia, and Canada. There were 48 scientists who represented 27 other countries and territories; most of these were visiting scholars at American institutions, but Michael Polanyi, for example, came from England especially to attend the meeting.

The large attendance from so many geographical sources demonstrated that, when programs of the symposium type are well chosen with respect to subject and are of high quality, a gratifying number of scientists and members of societies not meeting with the AAAS will travel substantial distances to attend them. On the other hand, although the Association, its 18 sections, and its conferences can ensure a good-sized convention, at least in a large metropolitan cen-

ter, it is clear that the participating societies contribute a substantial and desirable "core attendance" and a welcome additional diversity of interests. At the seventh New York meeting, 12 societies participated with annual national meetings—the American Astronomical Society, American Documentation Institute, American Nature Study Society, Entomological Society of America, History of Science Society, National Association of Biology Teachers, Scientific Research Society of America, Sigma Delta Epsilon, Society of the Sigma Xi, Society for the Study of Evolution, Society of Systematic Zoology, and the Society of Vertebrate Paleontology. Forty-one other societies arranged special or regional meetings—notably the Ecological Society of America and the American Psychiatric Association, with seven sessions and a four-session symposium, respectively. Finally, an additional 33 societies were the formal cosponsors of the programs of appropriate sections or other societies.

Table 4 shows the 5327 registrants analyzed by subject fields, except in 137 instances where this line on the registration slip was left blank and no other clues were available. In this analysis, every effort was made to record each individual's primary interest; if secondary interests had been recorded, some of the geologists were also geographers, paleontologists were interested in evolution, high-school science teachers could have been classified as biologists or chemists, and so on. If the data on the different disciplines were grouped under still broader headings, the composition of the registered attendance was:

Physical sciences and applications	1064	20%
Biological sciences and agriculture	1702	32%
Medical sciences	1036	20%
Psychology, anthropology, and social sciences	507	9%
Science teaching and education	531	10%
General interest and other	487	9%
	5327	

Exhibitors of the books, instruments, and laboratory supplies which scientists and teachers use have an understandable interest in the composition of the attendance at AAAS meetings. From the foregoing data—and also bearing in mind that so many of the registrants were department heads, directors of research, and others in a position to decide on textbooks and other materials—it is apparent that a AAAS meeting, diversified as it is, is well worth the participation of those who produce the things scientists need and, collectively, the meeting provides an exceptional opportunity for large industries to show some of their technological accomplishments.

## Annual Exposition of Science and Industry

The 1956 Annual Exposition of Science and Industry filled the Georgian Room, Foyer, and Ivy Suite on the mezzanine of the Hotel Statler and overflowed around three sides of the mezzanine well or upper lobby; in the center of the rotunda, on loan from *Look* magazine and under the auspices of the Department of Geology, Columbia University, was a 6-foot 6-inch globe of the world with carefully executed relief features of all continents. Necessarily, aisles were narrower than ideal, but the close proximity of the exhibit area to the AAAS main registration, Visible Directory of Registrants, Press Room, and the hotel's principal session rooms made the exposition of maximum convenience for visitors. Altogether, there were 92 booths.

The names of most of the 70 exhibitors and descriptions of their exhibits appeared both in the General Program-

Table 4. Registrants by subject fields.

Mathematics and statistics	86
Computers	36
Physical sciences	
Physics	187
Meteorology	6
Astronomy	202
Chemistry	276
Geology and paleontology	117
Geography	23
Engineering and industrial science	154
Biological sciences	
Mycology	18
All other botany	157
Ecology	86
Evolution	16
Genetics and cytology	95
Microbiology	54
Parasitology	13
Entomology	599
All other zoology	285
Biology (in general, and other)	301
Agricultural sciences	78
Medical sciences	
Bacteriology and virology	42
Biochemistry (including nutrition)	209
Physiology	130
Psychiatry	62
Public health	9
Dental research	72
Pharmacology and pharmacy	224
Medicine (in general, and other)	288
Psychology	193
Economic and social sciences	
Economics	16
Sociology and criminology	47
Anthropology	147
History and philosophy of science	81
Science teaching and education	531
Scientific editorial problems, technical writing, and documentation	172
Interest in three or more sciences	178
No field indicated	137
Total	5327

Directory and in the preconvention issue of *Science*. Those that did not are listed here: AAAS Advertising Department; Columbia University, Department of Geology; Foundation for Integrated Education; Geophysical Maps, Inc.; IMPCO, Inc.; Otto Klein, Publishers; P. M. Lennard Company; E. Leitz, Inc.; New York State Society for Medical Research; and Street and Smith Publications, Inc.

The exhibitors of the seventh New York meeting have already expressed their satisfaction at the contacts made; indeed, exhibitors not participating at New York have already indicated their interest in the 1957 Indianapolis meeting of the Association.

## AAAS Science Theatre

The Science Theatre, which shows a selection of the latest foreign and domestic scientific films, was inaugurated at the Chicago meeting of 1947. It is now an established feature of the annual meetings of the Association. At New York the theatre was located in the East Room of the Hotel Statler in proximity to both the ballroom and the Annual Exposition of Science and Industry. For the nine programs given during the week, the 200 chairs were well filled by ever-changing audiences. Many came to see a particular film and stayed for several more. The 31 different films listed in the General Program-Directory were shown twice, and a few three times. *Nuclear Reactors for Research*, produced by North American Aviation, was substituted at the last minute for *The Sodium Reactor Experiment Fabrication*, produced by the same company, because of an unanticipated later release date. We were particularly sorry that a not very well conceived film on petroleum was inadvertently substituted by the Los Angeles office of the Modern Talking Machine Service for *A Report on Smog*, Stanford Research Institute's latest summary of the subject, and we apologize to those who came from a distance especially to see it. The time allotted to the second showing of this film was filled by a film entitled *Blood Vessels and Living Pathology*, produced by the Medical Film Guild from material supplied by two professors, Lutz and Fulton, department of biology, Boston University. The Association again expresses its appreciation to those who so kindly lent such excellent subjects.

## Work of the Local Committees

A scientific meeting as large and as complex as the annual meeting of the AAAS does not just happen. It cannot take place, nor can it succeed, without the cooperation and assistance of a great many agencies and persons. Of critical

importance among these are the local committees and the general chairman who appointed them. The Association and all who attended the seventh New York meeting are much indebted to Eugene Holman, chairman of the board, Standard Oil Company (New Jersey), who made distinguished appointments to the local committees, kept in close touch with all phases of the meeting, and graciously welcomed members and friends of the Association the evening of 28 Dec. On behalf of the Association, a grateful acknowledgment of the extent of our indebtedness to Holman is made here.

Deep appreciation of the work of the Committee on Physical Arrangements, headed by Samuel Schenberg and Edward G. Bernard, was made earlier, under the section on arrangements. There were three other committees and each of them filled an indispensable key role. The Association expresses its gratitude to the members of all four committees and, in particular, to those whose names follow. The Exhibits Committee, under the chairmanship of Albert Bradley, chairman of the board, General Motors Corporation, assisted materially in enlisting the presence and support of industrial exhibitors that otherwise would not have been present. The Committee on Public Information, headed by Marion Harper, Jr., president of McCann-Erickson, Inc., and its associate, Communications Counselors, Inc., vice president Murray Martin in charge, provided expert advice and assistance in publicizing the meeting locally. Premeeting announcements in the press are not readily secured (probably on the principle that a meeting is not news until it happens!) but the local scientific societies, and the local press, radio, and television in New York did provide an exceptional amount of advance information on the meeting. Additional details on this, and the national coverage during the meeting, will be found in Sidney Negus' report.

The Finance Committee, through its able chairman, W. J. Murray, Jr., chairman of the executive committee, McKesson & Robbins, solicited funds to reduce the deficit of the meeting. It is antici-

pated that when all replies are in, the deficit will have been resolved. Firms and individuals who have made contributions include:

American Telephone and Telegraph Company  
American Tobacco Company  
Armco Foundation  
Bell Telephone Laboratories  
James F. Brownlee, partner, J. H. Whitney & Company  
Frederic W. Ecker, president, Metropolitan Life Insurance Company  
Econometric Specialists, Inc.  
Fred Emmerich, president, Allied Chemical & Dye Corporation  
Equitable Life Assurance Society  
Food Machinery and Chemical Corporation  
General Motors Corporation  
Harold H. Helm, chairman, Chemical Corn Exchange Bank  
International Business Machines Corporation  
International Nickel Company, Inc.  
International Paper Company  
International Telephone and Telegraph Corporation  
Eli Lilly and Company  
McKesson & Robbins  
Merck, Sharp & Dohme  
National Dairy Products Corporation  
Owens-Corning Fiberglas Corporation  
S. B. Penick & Company  
Radio Corporation of America  
Smith, Kline & French Laboratories  
Standard Oil Company (New Jersey)  
George Van Gorder, chairman of the board, McKesson & Robbins  
Warner-Lambert Pharmaceutical Company  
Sidney J. Weinberg Foundation  
Western Electric Company

To these should be added a contribution made for the fourth time by the United-Carr Fastener Corporation of Cambridge, Mass., to the AAAS for any worthy purpose and applied to the seventh New York meeting.

#### Other Acknowledgments

At the AAAS Smoker, as in past years, the Coca-Cola Company through the

Coca-Cola Bottling Company of New York, the National Biscuit Company, and Philip Morris, Inc., generously donated their products. The Association gratefully acknowledges these generous and recurrent donations.

In concluding this report of the seventh New York meeting, I wish to express my personal appreciation to Royal W. Ryan, Walter R. Potts, and others of the staff of the New York Convention Bureau, who supplied expert professional assistance and friendly help throughout; to the managements, sales managers, and other key personnel of the Statler, Sheraton-McAlpin, and other hotels for their many courtesies and assistance; and to the secretaries and program chairmen of each section and participating organization for their able cooperation, especially with reference to copy and galley proof for the 400-page General Program-Directory.

#### Awards and Prize Winners

The following annual awards were made during the meeting: 29th AAAS Newcomb Cleveland prize to Neal E. Miller, James Rowland Angell professor of psychology, Yale University, and James Old, associate research psychologist, department of anatomy, University of California at Los Angeles [*Science* 125, 60 (1957)]; 12th Theobald Smith Award in the Medical Sciences, to Oscar Tousteter, associate professor of biochemistry, Vanderbilt University [*Science* 124, 1287 (1956)]; 2nd AAAS-Anne Frankel Memorial Award for Cancer Research, to Jacob Furth, associate director of research, Children's Cancer Research Foundation, Harvard Medical School [*Science* 125, 60 (1957)]; 1st AAAS-Ida B. Gould Memorial Award for Research on Cardiovascular Problems, to C. W. Lillehei and Richard Allison De Wall, University of Minnesota School of Medicine [*Science* 125, 60 (1957)]; and the 2nd AAAS-Socio-Psychological Prize, to Herbert C. Kelman, research psychologist, National Institute of Mental Health [*Science* 125, 60 (1957)].





# Public Information Service

Sidney S. Negus

For the AAAS New York meeting, an unusually strong local committee on public information was appointed last summer to help set the stage for this complex operation. It was composed of ten members and headed by Marion Harper, Jr., president of McCann-Erickson, Inc. Richard J. Farricker, vice president of this well-known firm, and Murray Martin, vice president of Communications Counselors, Inc., "carried the ball" initially and met with us in October on two occasions at the AAAS Washington office. Soon after these conferences, we met again in Washington with Michael Sklar, who was assigned by the Columbia Broadcasting System to produce the hour-long AAAS-CBS coast-to-coast television show, *The New Frontier*, on Sunday afternoon, 30 Dec.

Early in December, Martin arranged a meeting of the local committee at the Metropolitan Club in New York, which Raymond L. Taylor and I attended. Plans recommended by the committee for premeeting public information were adopted. A week following, as part of this plan, a press conference was arranged by William Falvey of Communications Counselors, Inc., at the Hotel Statler for the purposes of announcing the highlights of the coming convention and of interviewing Oscar Touster, associate professor of biochemistry, Vanderbilt University School of Medicine, as winner of the Theobald Smith Award in the Medical Sciences for 1956. This was one of the most successful premeeting press conferences ever held by the Association. It was set up in less than 48 hours with the assistance of Allan D. Bass of Vanderbilt and secretary of AAAS Section N (Medicine).

Meanwhile, Virginia Casey of Communications Counselors, Inc., had come into the picture and did a remarkable job, before and during the meeting, arranging radio and television programs in

cooperation with Alec Jordan, my associate in charge of air programs. The latter worked closely with the AAAS-CBS show, which was so ably produced by Michael Sklar. Many of the talks during the meeting were taped by the major networks, the City of New York Municipal Broadcasting System, the Voice of America, and others and will be on the air for weeks to come. Before and during the meeting, 31 AAAS radio and television programs were broadcast from the New York area.

Secretaries and program chairmen of the 18 AAAS sections meeting in New York and those of the 87 participating societies and officers of the Association cooperated splendidly with this department and, for the most part, so did the 1350 authors of papers on the program. The only complaint from science writers in the press room at New York was that there were not enough *complete* papers available to supplement corresponding abstracts which appeared to be newsworthy. Special commendation must be recorded in this report for H. B. Sprague, professor of agronomy, Pennsylvania State University, and secretary of AAAS Section O (Agriculture). The program arranged by this section on grasslands and its cooperation with the department were outstanding both in content and early preparation.

Two hundred twelve accredited reporters representing the press, radio, and television registered in the press room at the Hotel Statler. Victor E. Cohn, science editor of the *Minneapolis Tribune*, was given the press-room prize for being the science writer farthest from home. Sixty-three other individuals in the United States and abroad reported the meeting from nontechnical abstracts and complete papers mailed to them before and during the convention. All American and several foreign wire services, including the Tass News Agency, plus all leading news magazines were represented.

Many remarked that the coverage by New York newspapers was good. Mayor Wagner's "Science Week in New York City" proclamation was especially appre-

ciated. News stories and wire pictures concerning the meeting must have been published widely outside New York, because clippings from many publications in this country and abroad are now being received. Feature stories, not requiring close deadlines, are beginning to appear in various publications and will probably continue to be published for some time to come.

For assistance in the press room at New York, we are grateful to McCann-Erickson, Inc., for contributing the services of five efficient secretaries for the 5 days of the meeting, Patricia Alexandre, Vicky Barnes, Shirley Gilson, Jane Lester, and Patricia Turano; to Communications Counselors, Inc., for making available to us the expert "know-how" of William Falvey and Virginia Casey; to Arthur D. Little, Inc., for contributing the services of Irving Telling as a press room associate; to the General Electric Company Research Laboratory for holding open house each evening for all science reporters in attendance; to the American Tobacco Company Research Laboratory, and Chas. Pfizer and Company, Inc., for providing luncheons in the press room during the meeting; to the Florida Citrus Commission, Eastern Airlines, and Noyes and Sproul, Inc., for the hospitable serving of fresh orange juice continuously each day in the press room; to Richard Magat of New York University, Office of Information Services, for arranging the party for science writers at the Faculty Club; to Dudley, Anderson and Yutzky of New York for entertaining the press each evening in its suite at the Statler; to Raymond S. Ashbaugh, convention manager of the Hotel Statler, for providing quickly and efficiently ideal press-room facilities; to Michael Sklar for his outstanding production of the AAAS-CBS television show; and to the "old-timers" of the National Association of Science Writers for invaluable technical advice.

Associates in the press room at New York were Thelma C. Heatwole of Staunton, Va., Wayne Taylor of Austin, Tex., Myron Weiss of New York City, Foley F. Smith of Richmond, Va., and Alec Jordan of New York. These individuals and the six others already mentioned were of invaluable aid in getting material quickly to reporters to whom, more than to any others, goes the credit for helping to make possible one of the four principal objectives of the AAAS: to increase public understanding and appreciation of the importance and promise of the methods of science in human progress. The Association is deeply appreciative of the outstanding world-wide coverage of its annual meetings by members of the NASW and other representatives of the Fourth Estate.

Dr. Negus, who is director of the AAAS Public Information Service, is chairman of the department of biochemistry at the Medical College of Virginia, Richmond.

# Reports of Sections and Societies, New York Meeting

## Mathematics (Section A)

Section A met 26. Dec. Tibor Rado (Ohio State University), retiring vice president of the section, gave an address entitled "A case history in pure mathematics," which was a semipopular exposition of the mathematical theory of rigid surfaces, together with a review of some of their present uses in engineering and a few suggestions for their future use. About 35 persons were present.

The section was cosponsor with Section A1 of the meeting on "The application of digital computers" held on 27 Dec.

C. C. MACDUFFEE, *Acting Secretary*

## Association for Computing Machinery (A1)

The Association for Computing Machinery met for the first time with the AAAS on 27 Dec. Under the cosponsorship of AAAS Section A, one session of five invited papers on the application of digital computers was presented.

JAMES E. ROBERTSON,  
*Program Chairman*

## Physics (Section B)

The orientation of atomic nuclei by optical methods was the subject vigorously discussed by a small group of specialists at one of the symposia. Optical pumping, optical orientation in a buffer gas, and relaxation times for the associated events were some of the topics covered. The session was chaired by Francis Bitter and organized by William B. Hawkins.

Interesting experiments on optical spectra originating in solids were presented by physicists working in quite divergent fields. There were reports on line spectra in rare-earth solids, lattice vibration spectra in crystals, infrared spectra in solid solutions, and spectra in solids condensed from discharges. This symposium, which brought together spec-

troscopists and solid-state physicists, was organized by William F. Meggers.

Diffusion as a process that tells us about the structure and physical reactions in solids was the subject of a symposium organized by H. B. Huntington. The discussion brought out the many ways in which the diffusion process enters into solid-state measurements and into our understanding of metallurgical processes. The first session covered the general problems of the relationship of diffusion to mobility, pressure, and grain boundaries. In the second session, the techniques of measurement and the nature of diffusion in crystals and semiconductors were discussed.

Symposia on crystal growth, organized by N. Cabrera, brought together a number of scientists working on various aspects of this important problem. The first session, chaired by David Turnbull, covered crystal growth from the melt. The second session, chaired by C. Herring, dealt with the growth of crystals in the interesting form of filaments or whiskers.

Alan T. Waterman gave the vice-presidential address and spoke on "Science in society today." In a vivid manner he showed how our growing society is faced with a scarcity of scientists. With statistics to bolster his observations, Waterman went on to analyze some of the bottlenecks which cut down on our production of scientists. In that part of his presentation dealing with research, Waterman described some of the administrative problems which confront us in this 20th century, giving special attention to the problem of large and costly projects which require cooperating groups of scientists to handle.

J. HOWARD McMILLEN, *Secretary*

## American Meteorological Society (B1)

As part of Section O's program on "Grasslands in our national life" the American Meteorological Society sponsored a session dealing with the present and future contributions of the meteorological and climatological sciences to the

problems of grasslands. About 60 people attended the session in which five papers discussing different aspects of the specific program question were presented.

In introducing the subject of grassland environments, C. P. Barnes (Agricultural Research Service) contrasted the climatically determined distribution of natural grasslands with the distribution of cultivated grasslands which reflects not only climate and environmental factors but also competition with economic crops.

J. R. Mather (Drexel Institute Laboratory of Climatology) showed how moisture indices are closely related to the distribution of grasslands and how the factors of the moisture balance, the moisture surplus, and deficit or soil moisture storage can be used in different agricultural studies.

E. R. Biel (Rutgers University), in discussing the climate of the layer of air in which plants grow, emphasized the climatic differences which exist both vertically and horizontally near the ground and showed how microclimates can be influenced by changing local environments.

J. M. Beall (U.S. Weather Bureau) described the Weather Bureau's program in agricultural meteorology and specialized crop-weather forecasts and gave details of cooperative grassland projects with land-grant colleges.

L. B. Leopold (U.S. Geological Survey), in discussing the climatic problems of western grasslands, emphasized (i) the need for increasing water supplies, (ii) erosion and sediment problems, and (iii) the need for the maintenance of forage production under grazing use, and described how climatology and microclimatology can contribute to such needs. He concluded that for climatology to assume its proper role, not only must the specific problems be clearly identified, but also the viewpoint of the professional meteorologist must be broadened to include an understanding of other disciplines.

J. R. MATHER, *Program Chairman*

## Chemistry (Section C)

Interesting and profitable sessions held by Section C consisted of two general sessions of 15 submitted papers in about 15 different interest areas, and three symposia sessions: "Chemical and biological aspects of cellular competition," arranged by Werner Braun (Rutgers University); "Biosynthesis of isoprenoid compounds," arranged by H. Boyd Woodruff (Merck and Company); and "Organic reaction mechanism," arranged by Ellis V. Brown (Seaton Hall University).

To our retiring chairman, Karl Folkers, Section C extends its best wishes, and to our new chairman, F. E. Cislak, we look forward in pleasant anticipation to the next annual meeting. It is not too early to plan on attending the AAAS meeting in Indianapolis in 1957 and presenting a paper before the chemistry section.

ED. F. DEGERING, *Secretary*

## American Association of Clinical Chemists (C2)

The session of the American Association of Clinical Chemists was devoted to a symposium on "Significant trends in clinical enzymology," Harry Goldenberg presiding. Talks were given on "Serum enzyme activities in cancer," by Oscar Bodansky (Memorial Center for Cancer and Allied Diseases); "Recent advances in enzyme methodology," by Harry Goldenberg (Hillside Hospital, Glen Oaks, N.Y.); and "Biochemical biopsy," by Felix Wroblewski (Memorial Center for Cancer and Allied Diseases).

Bodansky discussed the extent to which serum enzymes can reveal the presence and progress of disease processes, and particularly of neoplastic disease, in human tissues. The use of serum alkaline phosphatase as an indicator of osteogenic sarcoma, osteoblastic or intrahepatic metastases, and of serum acid phosphatase as an indicator of prostatic carcinoma was reviewed. Pointing out the tendency for excessive glycolysis to occur in tumors, Bodansky briefly considered two of the serum glycolytic enzymes (adolase and lactic dehydrogenase). His more detailed studies dealt with serum phosphohexose isomerase elevations as an index of tumor growth in metastatic carcinoma of the prostate and breast, and with the serum phosphohexose isomerase/phosphoglucumutase ratio as an indicator of the site of tissue metastases.

"The recent extensions of enzyme studies to various disease states has pointed up the more precise diagnoses which result when enzymologic studies are brought to bear on clinical problems," said Wroblewski. "Tissues and specific pathologic states of these tissues may be characterized not only by their cellular flora and reaction but in some cases by their enzyme patterns. These enzymatic tissue alterations may precede, parallel, or follow the histologic changes in disease states. The tissue involved may be biochemically biopsied by way of the blood stream and other body fluids. The further extension of this concept of biochemical biopsy would appear to be a potentially promising area for further study."

In pointing out the need for more exacting enzyme methods to delineate

neurological as well as gross organic disorders, Goldenberg stressed the analytic and kinetic aspects of enzyme measurements. He indicated that methods can be set up to afford both accuracy and simplicity under routine conditions and recommended the use of pure, synthetic substrates which are custom-tailored for colorimetric analysis; use of stabilized reagents; elimination of blank corrections; elimination of unnecessary manipulations; and elimination of empirical graphical plots. A simple and general expression was introduced which permits the chemist to calculate enzyme concentration directly from the color of the reaction products, regardless of photometric or enzymic complications.

HARRY GOLDENBERG, *Program Chairman*

## Astronomy (Section D)

The program of Section D was a full and varied one. The American Astronomical Society met with the AAAS for the first time since the 1946 Boston meeting, and Seth B. Nicholson delivered his retiring AAAS vice-presidential lecture on "The solar cycle" following a joint AAS-Section D dinner. The Astronomical League and Section D sponsored a symposium, arranged by Harold B. Davidson, on "The benefits of astronomy to young people."

The AAS program consisted of 51 contributed papers, the Helen B. Warner lecture on "Photometric distances of galactic clusters," by H. L. Johnson, and a symposium on "The recent close approach of Mars." The attendance at the symposium was 250, and there were 202 AAS registrations. We are deeply indebted to Albert E. Parr and to J. M. Chamberlain and the staff of the Hayden Planetarium for their hospitality and the fine arrangements for the meeting.

The Astronomical League program was an outstanding success, with speakers ranging in age from 10 to 19 years. The topics ranged from amateur observations with small telescopes to a geometric proof of the law of areas and a series of five talks on spectroscopy.

FRANK K. EDMONDSON, *Secretary*

## Astronomical League (D2)

The Astronomical League, with the American Astronomical Society and AAAS Section D (Astronomy) as co-sponsors, presented on Friday a program of the offerings of juniors. Catherine Barry, specializing in classes for young children, pointing out how fertile is the imagination of children, how easily they can be guided, and how well they grasp new ideas. Saul Adelman (Washington, D.C.) set the pace, exhibiting the youth-

ful interest in the quest for knowledge and the desire for the best tools. Robert Strom (New York) had unusual poise and self-possession for a 10-year-old and reported a year's observation of sunspots with real originality and with naive advice to help "neophytes" avoid the errors he was forced to make. Cecily Resnick (Oak Park, Ill.) had very original comment on spectroscopic binaries. Bernadette Londak's (Chicago) "Proof of the theorem of areas" was well conceived, well considered, and well illustrated. Stephen Strom (New York) clearly and intelligently described planetary observing with the aplomb of a veteran many times his years. Martin Gerstens' (New York) transference of optical principles from photomicrography to astrophotography was refreshing.

Carol Lippard, Warren Smalley, Marcellus Porter, John Cosgrove, and James Bullock, all of Louisville, Kentucky, presented a mature and complete exposition of spectroscopy. A more complete and better planned story has not been heard! Their accuracy and brevity was amazing! All of these youngsters were limited to 5 minutes apiece: some used less time, and only one or two used a minute or two more. Their elders could learn from this! The audience was fascinated. George Nielson (Columbus, O.), not on the program as printed, was given 2 minutes to describe the radiotelescope that he and Ivan Loftis had built. Photographs of this telescope were on exhibit.

All our juniors were enthusiastically received. Clarence E. Johnson then spoke briefly on the organization of junior groups, and Franklyn Branley pointed out the impact of astronomy on the juniors and the effect they would have on science. He also made the point that science is not the difficult ivory-towered thing that one should fear to study; these juniors were the proof of that.

Ben Adelman exhibited the "Junior astronomer." G. R. Wright exhibited models of the "Moonwatch team" and delivered an excellent and well-prepared discussion on the techniques to be used in observing the artificial satellite next year.

HAROLD B. DAVIDSON,  
*Program Chairman*

## National Speleological Society (E4)

The NSS meeting held in conjunction with the AAAS was presided over by Joseph Lawrence, Jr. William E. Davies' paper "Solution features in polar areas" not only presented evidence of solution in limestone areas of northern Greenland hitherto thought to have been covered by glacial deposits but also reported on a large cave apparently containing solution formations that was spotted less than



600 miles from the North Pole. Just how this cave could have escaped destruction from the movement of the ice sheets is not clear, although it is situated on a plateau approximately 1000 feet above the present sea level.

At the other extreme of temperature range, Russell and Jeanne Gurnee reported on their trip into the highlands of Venezuela to make a study of *Steatornis caripensis*, in Guacharo cave. This bird is the only one known to reside in a cave at all phases of its life cycle, although it does leave the cave for a few hours at night to obtain food. The first colored pictures of this bird in flight in the cave and roosting at its nest were shown.

Papers dealing with techniques of cave exploration included one by John Parker and another by John Spence, the latter dealing mainly with cave photography. William R. Halliday presented a paper dealing with reports of bad air in caves, and Brother G. Nicholas reported on the collapse of several caves in western Maryland owing to shock waves resulting from nearby munitions explosions.

BROTHER G. NICHOLAS,  
Program Chairman

#### Zoological Sciences (Section F)

The meetings arranged or sponsored by Section F covered a wide range of subjects in most of the special fields represented in the section as well as several areas in which the section is interrelated with other sections. These all drew an excellent attendance, ranging from 25 to 100 people in the specialized meetings, and 75 to more than 400 for some of the symposia. The Section F luncheon had only 52 members, but about 200 came in for the vice-presidential address by Bentley Glass.

Annual meetings with sections for contributed papers were held by the Society of Systematic Zoology, the Entomological Society of America, the Ecological Society of America, the Society for the Study of Evolution, the Society of Vertebrate Palaeontology, and the National Association of Biology Teachers. The following organizations sponsored or cosponsored symposia with the cooperation of Section F: American Society of Zoologists, American Society of Naturalists, Genetics Society of America, Society of General Physiologists, the International Union for the Study of Social Insects, the American Museum of Natural History, the New York Academy of Sciences, Brookhaven National Laboratory and the U.S. Atomic Energy Commission. This year, as in the past, contributed papers which were sent to the secretary were included in the programs of societies which were holding meetings.

The distinctive characteristic of the New York meeting, in addition to the large attendance, was the large number of symposia which brought together representatives from many different fields and emphasized that members of different sections, as C, E, F, G, and H, are concerned with problems to which each one is contributing. In every one of these symposia there was extended discussion from the floor, which frequently added to the effectiveness of the material which the symposium speaker was presenting. This was especially evident in the New York Academy of Sciences symposium on "Modern ideas of spontaneous generation," which was published by the academy, and in the Section G symposium cosponsored by Section F on "Some unsolved problems in biology." The latter subject might profitably be presented for several years with different speakers and treating different areas. It is probable that in future years it may be desirable to present fewer symposia including only one involving cooperation between fields and two or more on specialized subjects.

The New York meeting showed that the increase in numbers of the specialized biological societies and their tendency to hold most of their annual meetings separately at other times than Christmas week has in no way lessened the importance of the more inclusive meeting in one of the large centers of population in the United States. Although most of the specialized biological societies affiliated with Section F prefer to hold their meetings with AIBS or with the Federation, many of them will arrange a meeting with AAAS every third or fourth year. In other years they will be represented by sponsorship of a symposium arranged by Section F. This will continue to make available a yearly meeting and should result in healthy stimulation and growth for American biological science. A small fund for paying travel expenses of a small number of symposium speakers is urgently needed.

HAROLD H. PLOUGH, Secretary

#### Entomological Society of America (F2)

The Entomological Society of America, formed in 1953 by the amalgamation of the American Association of Economic Entomologists (founded in 1889) and the Entomological Society of America (founded in 1906), held its fourth annual meeting 27-30 Dec. There were approximately 600 entomologists registered at the meeting.

The society, in its general program, featured a panel discussion on "Insect attractants," and an invitational paper on "Insect flight." The address of the retiring president, Bennet A. Porter, was on

the topic, "What have we learned from the codling moth?" The customary full schedule of papers for presentation necessitated five or more concurrent sessions of the six sections and seven subsections of the society throughout most of the period of the meetings, with the exception of times reserved for meetings of the society as a whole. In addition to the technical program, there was featured a president's luncheon honoring presidents of the society, present, past, and future. An entomologists' mixer was held on 27 Dec.

Programs of the ESA are customarily presented under the subject-matter groupings of general entomology, physiology and toxicology, biology, medical and veterinary entomology, control, extension and regulatory entomology, and chemical control. In summary, the section programs included 175 submitted papers, five invitational papers, and seven symposia-type programs of 1/2 day each. Among the more outstanding of the scientific contributions in the sectional programs were the following symposia: "Teaching entomology," "Museums and their problems," "Insects in nature," "The fate of insecticides," and "The nematode situation." A tour of the Rockefeller Institute of Medical Research was enjoyed by those interested in the relations of insects to plant diseases. The local arrangements committee under R. E. Heal did an outstanding job, the educational exhibits arranged by that committee being especially good.

The 5th annual meeting of the society will be held at the Hotel Peabody, Memphis, Tennessee, 2-5 Dec. 1957.

P. W. OMAN, Program Chairman  
R. H. NELSON, Executive Secretary

#### International Union for the Study of Social Insects (F3)

The North American Section of IUSSI held a two-part symposium on "Communication in Insects" arranged by T. C. Schneirla (American Museum of Natural History). William S. Creighton (City College of New York) presided at the first session on "Perspective on fact and theory," and Kenneth D. Roeder (Tufts University) presided at the second part on "Problems and methods."

During the first session Vincent G. Dethier (Johns Hopkins University) told how hungry flies were made to dance by feeding them concentrated sugar solutions. The axis of the dance is oriented to light and to gravity. A dancing fly regurgitates on the substrate when it is crowded by other flies; these other flies eat the regurgitated material and may also dance. The reactions are similar to those in bees, except that in flies foraging flights do not follow the dances.



Edward O. Wilson (Harvard University) using the method of Ribbands, who fed radioactive phosphorus to bees, fed radioactive iodine to ants of three genera and, with a Geiger counter, checked its spread through the colony. In *Crematogaster* and *Formica* the spread was rapid; in *Pogonomyrmex* it was slow. No evidence was found that *Pogonomyrmex* regurgitates liquid food as do the first two.

Arthur C. Cole (University of Tennessee) surveyed the various mechanisms operating in the communication of ants. Mechanisms discussed ranged through vision, audition, olfaction and tactile, and a variety of response properties involved with these modalities. "Trophallaxis" was considered, not only with respect to actual food exchange, but also to related stimulative processes and to its visceral basis in different ants.

Schneirla pointed out that communication, defined as "behavior and related processes influencing behavior," is present in ants, but not "language," or "symbolic communication." Ant communication may be analyzed into processes of *trophallaxis* (reciprocal stimulation and not merely food exchange) and of orientation. In ant communication not only excitatory effects but also a variety of directionalizing and integrating influences are involved according to species.

Discussants for the first part of the symposium were J. A. Downes (Division of Entomology, Canada), Robert E. Gregg, University of Colorado), and Neal A. Weber, Swarthmore College).

The theme of the second part of the symposium was that communication can be considered as the coupling or interaction between two systems. The output of one system in some measure acts upon the input of the other. Hence, a knowledge of the physiological characteristics of the input or sensory mechanisms of insects is of prime importance in assessing their ability to communicate.

The full potentialities of insect sense organs as receivers are not usually revealed by behavioral studies alone. Asher Treat (City College of New York) defined phonoreception as the obtaining of information from mechanical vibrations originating at a distance. In intraspecific communication, timing and distribution of acoustic pulses have greater signal value to insects than has pitch or quality. Insect tympanic organs are displacement-sensitive receptors and are potentially capable of directional sensitivity. The noctuid tympanum contains only two acoustically sensitive cells and seems little adapted for directional localization. Electric recording of the afferent discharge from this ear confirms its ultrasonic range and its ability to respond to the ultrasonic pulses of predatory bats. On the other hand, although some intensity discrimination is possible, there is no evidence that moths can discrimi-

nate differences in pitch or can accurately localize a source of sound.

Chemoreception is a sense modality of widespread importance in insect communication. Edward S. Hodgson (Columbia University) reported on a neurophysiological analysis of the impulse input to the central nervous system from chemoreceptors. Contact chemoreceptors may respond not only to nutritionally significant chemicals but also to tactile and temperature changes. The behavioral significance of this multiple sensitivity was discussed. Commonly, chemoreceptors are spontaneously active, a behaviorally significant stimulus causing either an increase in impulse frequency, a decrease, or a particular impulse grouping. There is an encouraging correlation between the properties of chemoreceptors as revealed by electrophysiological and by behavioral methods of study.

Communication between the sexes is a universal prelude to mating in both social and asocial insects. Ilse Schwinck (New York University-Bellevue College of Medicine) analyzed the factors involved in the assembly of males to a virgin female of *Bombyx mori*. The odor of the female is not entirely species specific, but it can cause the direct orientation of males to its source over short distances when the concentration of odor is high and the gradient steep. When it is highly diluted over the considerable distances traveled by males in the field, the female odor merely causes an increase in the random activity of the males. When they are so activated, the airstream becomes the main orienting factor in male behavior, and there is an upwind movement to the odorous source. Under these circumstances an odor gradient appears to play no part in the orientation.

To the student of behavior the animal is the proverbial "black box." By manipulating its inputs and observing its outputs, he attempts to arrive at generalizations regarding the mechanism within. Horst Mittelstaedt (Tufts University and Max Planck Institute for Behavior Physiology) discussed steering mechanisms in insects and showed how it is possible to apply some of the formal concepts of communications theory to the analysis of insect behavior. As examples of this application, he analyzed phototaxis in the firefly, optomotor reactions in the dragonfly, and orientation of the praying mantis to its prey. The stroke of the forelegs in the mantis, the most complex of these systems, is predetermined by visual and proprioceptive information regarding the relative angles of prey, head, and prothorax.

These papers initiated a lively discussion which continued sporadically on various informal occasions throughout the New York meeting. In addition to the speakers the main participants in these discussions were V. G. Dethier,

William van der Kloot (Cornell University), and T. C. Schneirla. It is apparent that the neurophysiologists and the behavioral psychologists can profit greatly from such mutual interaction, although their communication may at times be obscured by semantic problems.

KENNETH D. ROEDER and WILLIAM S. CREIGHTON, *Presiding Officers*

## Society of Systematic Zoology (F5)

The ninth annual meeting of the society followed the usual pattern of its meetings but included far-reaching, behind-the-scene activities that will have important results in the near future. The election of officers for 1957 was announced by the council.

The society's book lounge has become the center of activities at the meetings. It was again visited by many members and many guests. Several of the latter joined on the spot, and many inquired about membership. A session for contributed papers aroused considerable interest, and a symposium cosponsored with the entomologists was well received.

In recent years we have distributed free at the meeting a mimeographed or printed list of the books exhibited. This year the list was much more elaborate, giving virtually all books on zoology or animals that are commercially available in the U.S. Its publication was supported by sale of advertising. Copies are being mailed free to all members of the SSZ and of the NABT. This list was prepared by the librarian, Ross H. Arnett, Jr. (St. John Fisher College, Rochester, N.Y.), who will in the future be designated editor of *Books on Zoology*.

It was decided to hold the 1957 annual meeting with the AAAS in Indianapolis.

R. E. BLACKWELDER, *Secretary*

## Society of Vertebrate Paleontology (F6)

The 16th annual meeting of the Society of Vertebrate Paleontology, 28-30 Dec., heard reports from 42 members. The society participated in a symposium on "Biotic communities," arranged by the SSE and was the guest of the American Museum of Natural History at a party before its annual dinner; motion pictures of fossil collecting in Mongolia during the 1920's were shown.

Tilly Edinger reported that the brain-cast of a Paleocene bat revealed that the specialized acoustic apparatus of this mammal was already developed more than 60 million years ago. Malcolm C. McKenna has recovered jaws and teeth of many small mammals previously known only from Paleocene rocks by washing and screening early Eocene sedi-

ments in Wyoming. New Cretaceous mammals have been obtained by similar techniques during the past summer.

Brian Patterson presented a revised classification of Edentates. Horace E. Wood II said that a rhinoceros with four toes in the manus, from the early Miocene Thomas Farm fauna of Florida, upset current ideas about rhino evolution; heretofore no four-toed rhinos had been known later than early Oligocene.

Donald E. Savage reported a sequence of five mammalian faunas of Miocene and Pliocene age in the Caliente Mountains of California, in deposits which interfinger with marine beds. Louis Thaler outlined the evolution of the teeth of microtine rodents and showed how it formed a basis for closer correlation of late Cenozoic deposits of North America and Europe.

Karl Koopman revealed the presence of bones of large ground birds in caves in Cuba. Max Hecht reported that a majority of the amphibians and reptiles in the Eocene Tabernacle Buttes fauna were burrowing types. Donald Baird discussed implications of new knowledge of Coal-Measures amphibians and reptiles revealed by etching the specimens. Gordon Edmund described the tooth replacement in fossil reptiles.

Bobb Schaeffer reviewed work on the mechanism of the teleost fish skull. Transformation of the primitive palcniscid skull to that of modernized ray-finned fishes involved a radical change in direction and attachment area of the adductor mandibulae muscle. Primitive bony fish were capable of snapping their jaws rapidly but lacked the strong bite of their modern descendants. Robert H. Denison questioned current concepts of the jaw structure of ancient armored fishes. Acanthodians, or "spiny sharks," should not be grouped with Arthrodires and other armored fishes in the class Placodermi.

This meeting was the most successful in the history of our society, if not the most interesting. One hundred and eleven persons participated in phases at the American Museum; I have no count of the attendance at the symposium on "Biotic communities," but noted that the room was well filled. The SVP will meet in Philadelphia on 3 Nov. 1957, and with the Geological Society of America at Atlantic City on 4-5 Nov.

JOSEPH T. GREGORY,  
*Secretary-Treasurer*

#### Mountain Lake Biological Station (FG6)

The Mountain Lake Biological Station breakfast, held 28 Dec., was well attended, considering the fact that not many biological groups were meeting with AAAS this year.

In introducing those present it was observed that attendants during most of the years since 1930 were represented. Bruce D. Reynolds called attention to the fact that he had retired as director in October 1956 and that Horton H. Hobbs had been appointed as his successor. Then he gave a brief history of the station, pointing out some of the difficulties encountered and the achievements realized during the 27 years of its existence.

The course work, which has always been good, should be improved by increased emoluments allowed instructors. Research has been greatly stimulated by a grant from the National Science Foundation. For the past 2 years the station has been operating at full capacity, with slightly less than 100 persons. Many square miles of virgin forests constitute the area for field work. Within the stone laboratory modern equipment makes possible research of a highly technical nature.

BRUCE D. REYNOLDS,  
*Program Chairman*

#### National Association of Biology Teachers (FG7)

The National Association of Biology Teachers presented two individual programs, a luncheon meeting and a guided tour, cooperated with AAAS in the panel meetings on "Moving frontiers of science," cosponsored with the other science teaching societies a Cooperative Committee symposium on "Meeting the science teaching manpower shortage," held a joint session with NSTA on "Techniques in elementary science," and held jointly with ANSS two programs and a field trip. Emery Will, chairman of the NABT audio-visual aids committee, presented three showings of teaching films.

The first NABT program was general, including reports on conservation leadership patterns in the United States and on the two NABT conferences on biology teaching supported by National Science Foundation grants as well as a variety of other topics of interest to biology teachers—the upper atmosphere, insect material, consultation services, spelling errors. The second, which dealt with techniques in high-school biology, consisted largely of demonstrations, by both teachers and students, of interest-getting devices and of laboratory and classroom procedures.

The joint session with NSTA, devoted to "Methods and techniques for elementary science," included a "Make it and take it" program, nutrition experiments, and a description of a natural science center for young people. The joint sessions with ANSS dealt with camping and with urban conservation. The former was planned by ANSS, the latter by NABT. The annual field trip of the two societies included visits to the Stanford Museum

and Nature Center, the Mianus River Gorge Sanctuary, and the Greenwich Audubon Nature Center. The luncheon address, by Roger L. Leatherman (University of Michigan), dealt with biological aspects of nuclear research and their implications on American science education.

JOHN BREUKELMAN, *President*

#### Botanical Sciences (Section G)

The meetings organized by Section G included two sessions for contributed papers and a number of symposia. The latter were uniformly successful, usually attracting attendance which strained the capacity of the rooms. Many of the symposia elicited spirited discussions and comments which suggested that this type of program be continued in the future.

The annual Botanists' Dinner was attended by more than 75 persons and represented something of an innovation in that a buffet style of serving was adopted in an effort to counteract the relatively high cost of dinners in New York City. It is worth noting that this innovation proved to be quite successful. The dinner was the occasion for informative addresses by the retiring chairman of Section G, Paul J. Kramer, and by Harriet B. Creighton, president of the Botanical Society of America. By arrangement the dinner took place 50 years to the day after the founding of the latter organization.

BARRY COMMONER, *Secretary*

#### Anthropology (Section H)

All 50 papers of the Section H program ran sequentially and without conflict with any general programs. The section celebrated the 100th anniversary of the discovery of Neanderthal man with a symposium jointly sponsored by the American Institute of Human Paleontology. The speakers referred to the number, variety, and significance of Neanderthal fossils unearthed since 1856.

In a second symposium, "Man in the tropics: the Caribbean," the points of view of geography, sociology, and politics, as well as of anthropology, produced diverse images of a single subject: the plantation way of life. A third symposium, "Transitional communities in India, Pakistan, and Burma," and a fourth, "Current studies in cultural evolution: Oceania," permitted casting of theories and problems of cultural anthropology in specific geographic regions, a technique



also applied in the Caribbean symposium. This approach, and the session specifically devoted to the subject, made cultural theory the central theme of the meetings.

At virtually every session, including that devoted to archeology, the discussion turned to questions of theory and method. The high quality of the symposia was matched in the contributed papers. The section also cosponsored symposia on forensic odontology and values in human ecology. One aspect of the latter subject, what man is doing to the world in which he lives, will be the theme for the Indianapolis meeting of the AAAS and should permit anthropologists to contribute significantly and be widely heard.

GABRIEL W. LASKER, *Secretary*

## Social and Economic Sciences (Section K)

The program of Section K included sessions of interest to each major discipline in the section—that is, economics, political science, sociology, and statistics.

A featured symposium was "The impact of natural science on social science," at which presentations were made by Bernard Brodie (RAND Corporation), Pitirim A. Sorokin (Harvard University) and by Benjamin H. Williams (Industrial College of the Armed Forces) in his vice-presidential address to Section K. Harold D. Lasswell (Yale University) presided. This program was cosponsored by Section K, the National Academy of Economics and Political Science, the American Political Science Association, and, by collaboration, the National Social Science Honor Society, Pi Gamma Mu. The papers of this meeting were all of very high quality, were warmly received by the large attendance, and precipitated much lively comment during the discussion period. Preceding the session was a dinner meeting held by Pi Gamma Mu in honor of the speakers and the officers of the cosponsoring organizations, officers of the AAAS, and members of the Section K committee. S. Howard Patterson (University of Pennsylvania), emeritus president of Pi Gamma Mu, presided.

Two symposia were cosponsored with the American Statistical Association. The first was on "Labor mobility and earnings," and papers were read by Theresa R. Shapiro (Columbia University) and Maurice C. Benewitz (City College of New York). Charles A. Pierce (New York State Department of Labor) was discussant, and Meredith B. Givens (New York State Income Study) presided. The program was arranged by A. J. Jaffe (Columbia University). The second symposium was on "Statistics in public

health." Papers were presented by Morris Greenberg (New York Department of Health), J. S. Tyhurst (McGill University), Harold Jacobziner (New York Department of Health), Herbert Nieburgs (Brooklyn Beth-el Hospital), and Abraham Oppenheim and Jules Vandow (New York Department of Health). George James and Carl L. Erhardt (New York City Health Department) presided and arranged the program, respectively.

Other sessions in which Section K participated were "Aids for environmental control" with AAAS Sections C, H, I, L, M, and N, and the Conference on Scientific Manpower; "Resource development and population growth" with AAAS Section P, together with the vice-presidential address of this section; "Science versus crime" with the Society for the Advancement of Criminology, the Association for the Psychiatric Treatment of Offenders, and the Institute for Research on Crime and Delinquency; and "Grasslands in our national life" with AAAS Sections O and G.

During the past year two joint sessions were held by Section K with the regular spring and fall sessions of the National Academy of Economics and Political Science at the Brookings Institution in Washington, D.C. The first of these was on "Industrial concentration in American economic growth" and the second on "American foreign aid: a reappraisal." Pi Gamma Mu collaborated in these joint meetings.

DONALD P. RAY, *Secretary*

## Society for the Advancement of Criminology (K7)

More than 300 persons, including many distinguished criminologists from the United States and other countries, participated in the "Science versus crime" seminar on 29 Dec. Other sponsors of the program were the Association for the Psychiatric Treatment of Offenders, the Institute for Research on Crime and Delinquency, and AAAS Section K. Donal E. J. Mac Namara (New York Institute of Criminology) presided. Some of the highlights of the program included the following.

Marcel Frym remarked that unemployment, owing to an amalgam of laws, customs, management policies, surety company regulations, and bad public attitudes, is the greatest bar to the successful readjustment of the ex-convict and the strongest stimulus to recidivism. Character Underwriters, Inc., a nonprofit corporation, is undertaking to insure selected ex-convict risks (chosen after exhaustive psychosocial screening), thus enhancing their employment chances.

Nicholas Pansegrouw (South Africa) pointed out that much criminological

theory is rejected by police, penologists, and other practitioners, not so much because it is impractical, but because it is bad theory. There is too much arm-chair analysis and ivory-tower star-gazing and insufficient large-scale experimentation under controlled conditions and too little interdisciplinary coordination.

In the opinion of Sydney Zebel, no social problem can be approached in a historical vacuum. Far too frequently such "modern" phenomena as juvenile delinquency and the narcotics problem are discussed as if other generations experienced no crime or social difficulties. Zebel suggested the formation of a committee of historians and criminologists to explore the literature in the field and to encourage the use of proper historiographic techniques in the preparation of future volumes.

Present approaches to the narcotics problem in the United States are evident failures, according to Hubert Howe. Instead of controlling the spread of narcotics use and addiction, we have legislated a tremendous profit into the traffic and forced the addict into collateral criminality to secure the huge sums necessary to support his level of addiction. The experience of other countries indicates that a more rational approach is to emphasize the public health-mental health aspects, rather than the law enforcement, and to set up a modified dispensary-clinic system through which the addict could obtain sustaining narcotic doses at pharmaceutical prices, thus eliminating the criminal profiteer and his adulterated product.

Forrester Washington pointed out that minority groups and alien groups have traditionally been labeled high-crime-rate groups in the United States. Sometimes their rates have been excessive when compared with their numbers in the population, but these rates have usually leveled off as the first and second American-born generations achieved status in politics and business or melted unobtrusively into the dominant group. At times, as in the case of the Puerto Rican minority in New York, the crime rate attributed to them has been maliciously exaggerated. Such statistical information as we have indicates that the present percentage of Puerto Ricans convicted of criminal offenses in the criminal courts of New York State is almost exactly proportionate to their numbers in the population. High color visibility complicates the race-crime problem and perpetuates it, as is evidenced by the continuing excessive crime picture among the Negro minority.

Albert Ellis said that many crimes not usually thought of as sex crimes have a strong sex element, either in their motivation, or in their modus operandi; pathological fire-setting (arson) for direct



sexual satisfaction or unconscious sex symbolism is a major example.

Totalitarian regimes (specifically Nazi Germany, Fascist Italy, and the Dominican Republic) have been able to reduce the incidence of common criminality (as distinguished from political crimes) to levels far lower than those achieved in the United States and other democratic countries. According to Mac Namara, some of the reasons for this are higher police population ratios (5 to 10 times as high as in the U.S.A.); better trained and disciplined police in semimilitary formations; stricter population controls (identification cards, criminal and alien registration laws, movement control); fewer inhibitions on police (unlimited search and seizure, detention without examination before magistrate, little control over methods of interrogation); siphoning off of aggressive antisocial elements into state-approved activities (for example, Storm Troops, Black Shirts, and other quasi-military formations "licensed" to kill, assault, rape, and loot their unpopular minority victims); dispersal of other aggressive elements into political underground activity, concentration camps, emigration, and exile; general apathy of the people. The lesson we learn is that there is a price for democracy and personal freedom and that a part of that price may well be a somewhat higher crime rate, not necessarily, however, as high a crime incidence as we are presently experiencing.

Mark Luckens told the group that chromatographic techniques in the identification of trace elements, in making comparisons, and in determining minute quantities in connection with criminal cases have proved markedly successful, particularly in homicides, hit-run accidents, and rape.

Cleve Backster told of the increasing use of instruments (polygraphs), narcotics (sodium amytal and sodium penothal), and hypnosis as scientific interrogation techniques. There has been tremendous improvement in methodology, but problems still to be dealt with include public ignorance, possible abuses by unethical or untrained practitioners, and admissibility of scientifically extracted admissions and confessions in legal proceedings.

The Yerebin letter [*Life* (23 Apr. 1956)], which purported to prove Stalin an Ochrana agent, was discussed by Martin Tytell and Isaac Don Levine.

General floor discussion centered on polygraph lie detection difficulties with the chromatographic technique, the statistical data supporting Mac Namara's thesis concerning totalitarian nations' crime rates, and the uses and abuses of psychiatry (particularly of psychoanalysis).

GENE ANN CONDON, *Secretary*

## History and Philosophy of Science (Section L)

The meetings of Section L commenced on 26 Dec. with a session of contributed papers. A two-session symposium on "Science and ethics," arranged by Joseph Mayer, was presented by a distinguished roster of speakers. On 27 Dec. the section, together with the American Philosophical Association (eastern division) commemorated the 100th anniversary of the birth of Freud with a symposium on the general significance of his work in a session that was highly stimulating.

On 28 Dec. a symposium on the "Interaction of science and technology" was held as a joint session of Section L and the History of Science Society, and there was a joint dinner of the same two groups at which Dorothy Stimson spoke, as president of the History of Science Society, and at which Henry Guerlac presented his thoughtful and provocative vice-presidential address on "Critics of science, friendly and unfriendly." The meetings of the section included also a splendid five-session symposium on "Measurement" arranged by C. West Churchman.

Great credit is due all the participants of all of the sessions for particularly fine presentations, which attracted full and lively audiences. The section is happy to announce the election of I. Bernard Cohen as chairman of the section for 1957.

JANE OPPENHEIMER, *Secretary*

## History of Science Society (L2)

In the first two of its sessions of contributed papers held on 28 Dec., the theme of the interaction of science and technology was particularly stressed. At the symposium held jointly with Section L, this theme was especially applied to metallurgy by Cyril S. Smith (Institute for the Study of Metals, University of Chicago). Smith spoke as a contemporary practicing metallurgist and stressed the long past of metallurgy as an empirical, rather than a theoretical, science. Frederick Kilgour (Yale University Medical School Library) similarly stressed the prior importance of empiricism in the development in antiquity of the wave theory of sound transmission; while John J. Beer (Hanover College), gave a more modern instance of the relationship between practical and theoretical science or research, in his case history of a German dye plant.

The same relationship between empiricism and scientific theory was reflected in the papers read by Marie Boas (Brandeis University) on 17th-century chemistry; by Thomas S. Kuhn (University of

California, Berkeley) on "The caloric theory of adiabatic compression," and in a third paper, "The role of the U.S. Navy in creating a national agency for aeronautical research," by Lee M. Pearson (U.S. Navy Bureau of Aeronautics), which especially stressed the danger involved in making science subservient to technology at the expense of basic scientific research. Interesting and informative comments on these sessions were provided by Bern Dibner (Burdny Engineering Library) and by Henry Noss (New York University). The sessions were chaired by Henry Guerlac (Cornell University) and R. B. Lindsay (Graduate School, Brown University), respectively.

More particularly related to the interrelation of the scientific theories of antiquity with those of succeeding centuries were the papers read at the 29 Dec. sessions. Marshall Clagett (University of Wisconsin) explored the transmission of Archimedean mathematics from antiquity to the Middle Ages and the early modern era; while Curtis Wilson (St. John's College, Annapolis) developed the interrelationship of Aristotelian logic and the medieval theory of supposition with physical and mathematical questions; and William H. Stahl (Brooklyn College) in his examination of the question, "Whose authority dominated medieval science?" provided evidence for the proneness of early medieval authors to rely for their facts regarding Greek geography and astronomy upon encyclopedists. Both the chairman of the session, Chauncey D. Leake (College of Medicine, Ohio State University) and the commentator, Edward Rosen (City College of New York) enlivened the discussion by remarks and comments on the subject.

Similarly historical in content were the contributed papers of the final session, over which John F. Fulton (Yale University Medical School) presided. J. B. deC. M. Saunders (University of California Medical School, San Francisco) described the evolution of rational theories of medicine and practice among the Egyptians; Genevieve Miller (Western Reserve University) drew upon modern sources down to the 19th century to show the continued interest and reverence for the ancient Hippocratic treatise, "On airs, waters, and places," and Lynn Thorndike (professor emeritus of Columbia University) described, from several manuscript sources, the contents of a treatise, "De complexionibus," on the relation of the four complexions to the external environment and to the influence of the celestial bodies. Pearl Kibre (Hunter College) noted particularly the close relationship between the latter work and the Hippocratic treatise.

Other highlights of the meetings in-



cluded the report on a mathematical manuscript containing the brief work of the ninth-century Thebit ben Corat by the visiting scholar, Aydin Sayili (University of Ankara), the report on the International Congress of the History of Science, by I. Bernard Cohen (Harvard University), and the award of the Ida and Henry Schuman prize in the history of science to Chandler Fulton (Rockefeller Institute for Medical Research) for his paper, "Vinegar flies, T. H. Morgan, and Columbia University"; with honorable mention to the runners-up, Edyth Lutzker and John B. Riley. Also noteworthy was the fact that at the annual dinner held jointly with Section L, the guests were honored with two addresses: one by the retiring president of the History of Science Society, Dorothy Stimson, and the other by the retiring vice-president of Section L, Henry Guerlac.

PEARL KIBRE, *Program Chairman*

#### Society for the Advancement of General Systems Theory (L4)

The Society for the Advancement of General Systems Theory met on 29 Dec. Because a quorum of membership could not be constituted, it was agreed to hold the election of officers by mail ballot, allowing the present *pro tem* committee to conduct the business of the society until the election of officers. A proposal to change the name of the society to Society for Systems Research was likewise deferred to be acted on by mail ballot. The session was concluded by a contributed paper presented by Stuart C. Dodd (University of Washington) on "Introducing 'systemmetrics' for evaluating symbolic systems."

The second session of the Society on 30 Dec. was devoted to a symposium, "Systems under stress," which included "The individual under stress," presented by James G. Miller (University of Michigan), and "The small problem-solving group under stress," presented by Anatol Rapoport (University of Michigan).

LUDWIG VON BERTALANFFY,  
*Executive Secretary, pro tem*

#### Engineering (Section M)

During the past year, Section M was pleased to welcome seven additional technical societies as affiliated members of the section. They are the American Geophysical Union, the American Meteorological Society, the American Industrial Hygiene Association, the American Public Health Association, the American Society of Safety Engineers, the Electrochemical Society, and Tau

Beta Pi. These additions form a total of 30 technical societies now affiliated with Section M. Although the total membership of these societies is more than 150,000, there are only some 3000 engineers registered members of our association. This clearly indicates the need for a better definition of the activities of the Engineering Section in a general scientific association of this type.

During the past year, the general relations between the officers, the board of governors, and the various sections of the association have greatly improved. A central program committee of the association has been formed to coordinate the activities of the various sections and to plan programs a year in advance. This committee meets with the section secretaries at least once a year. We hope by this means to develop programs of more general interest to the association as a whole; to develop more cosponsored programs among the various sections, and to promote the relations between science and the general public.

Section M committee held two meetings during the year in New York. At these meetings, the administrative secretaries of the various affiliated societies were invited to attend. The internal reorganization of the section has been greatly improved as a result of these joint meetings. In addition to the committee meeting, several meetings of the program committee were held under the chairmanship of Irving P. Orens. The next meeting of the section committee is scheduled for 5 Mar. 1957 at 1:30 P.M. in room 1101, Engineering Societies Building, 29 W. 39 St., New York, N.Y.

The general topic of Section M's program was "Aids for environmental control." There were three sessions at which ten papers were presented. At session 1, the topic was "Overcoming normal and abnormal physical limitations." The chairman was Eugene F. Murphy (Veterans Administration), and the attendance was 135. At session 2, the topic was "Extending mental and rational powers." The chairman was Irving P. Orens (Newark College of Engineering), and the attendance was 140. The third session was on "Breaking the language barrier." Its chairman was John Lotz (Columbia University), and the attendance was 120. Section M cosponsored the sessions of the Scientific Manpower Commission and the two symposia of the AAAS.

A feature of the meeting was a luncheon given by Charles M. Gratz, research surgeon of New York City and head of the New York State Institute of Biomechanics. The luncheon celebrated some 21 years of research by a group of medical men and engineers on the effects of accidents on human beings. It included studies of the stresses in bones and mus-

cles and the surgery of rehabilitation.

Clarence E. Davies is the 1957 chairman of the section, and E. Paul Lange is the secretary. The committee-at-large is composed of K. F. Kayan (Columbia University), M. L. Towle (Cooper Union), W. M. Allan (City College of New York), F. S. Mallette (ASME). All representatives of affiliated societies are members of the section committee.

During the last 12 years, a serious attempt has been made to interest engineers in the activities of the AAAS. The many developments in the fields of science and engineering during the last 50 years have been of such a nature that they require a close cooperation of all branches of science. We feel that the AAAS offers an excellent medium to bring about this close relationship. Section M's first problem was to obtain the active support of the various engineering societies in the activities of the AAAS. Under the excellent leadership of our chairman, C. E. Davies, we are now in a position to state that Section M has the support of the engineering group. The engineering group will welcome the cooperation of the various sections of the AAAS in providing a medium where the problems of pure and applied science may be discussed and where our relations with the general public may be improved.

FRANK D. CARVIN, *Secretary*

#### Medical Sciences (Section N)

In addition to the symposium arranged by Section N, this section cosponsored several other excellent programs. The Section N program this year was arranged by Bernard B. Brodie. Edmund W. Sinnott ably and pointedly in the first paper set a standard for the subsequent presentations.

Sinnott expressed the opinion that a knowledge of intracellular organization and intercellular communication is the key to the function of the nervous system. M. C. Nui reviewed his more recent investigations on chemical inducers and emphasized particularly the important role of ribonucleic acid (RNA). Harry Grundfest presented evidence to indicate the role of both chemical and electric mechanisms in the transmission of nerve impulses. The organization of the sensory and motor cortex in the mammalian cerebral cortex was reviewed by Clinton N. Woolsey.

Joseph Brady indicated by studies on rats and monkeys that induced behavior patterns can be altered independently by different tranquilizing drugs. Similar conclusions drawn from the work of Keith Killam suggest that more precise methods for studying the mechanism of action of drugs affecting brain function may be

developing. The last three speakers reviewed three separate areas of experimentation on the human being, indicating that rapid progress is being made in our fundamental understanding of the dysfunctions of the brain.

ALLAN D. BASS, *Secretary*

#### Alpha Epsilon Delta (N1)

Approximately 200 premedical and medical educators and students attended the symposium on premedical education arranged by Alpha Epsilon Delta at the Cornell University Medical College on 29 Dec. Those in attendance heard talks by William H. Hubbard (New York University Medical College), L. W. Hanlon (Cornell University Medical College), W. F. Walker (Oberlin College), and J. T. Cowles (University of Pittsburgh Medical School) and participated in a panel discussion led by E. Hugh Luckey (Cornell University Medical College), with George E. Miller (University of Buffalo Medical School), William E. Cadbury (Haverford College), and Norman F. Witt (University of Colorado).

Davis G. Johnson (State University of New York Medical Center, Syracuse) addressed a luncheon gathering of 135 on methods of improving liaison and co-operation between medical and liberal arts colleges. The afternoon was spent in informal personal discussions between the premedical advisers and the admission committee representatives in attendance from 15 medical schools.

MAURICE L. MOORE, *Secretary*

#### Dentistry (Nd)

Four sessions were held on 28 and 29 Dec. The first was devoted to the practical contributions of science to dental practice. Six papers were presented, and 50 people were in attendance.

Two sessions were devoted to "Human dentition in forensic medicine" in which Sections H and N were cosponsors. Eight papers were presented. These dealt with the identification of people by means of the teeth and the rates and sequence of tooth development. Racial traits and genetic influence on dentition were also discussed. There were 50 to 60 in attendance at each session.

A second joint session was devoted to a discussion of antienzymes. This session was cosponsored by Sections C, N, and Np. Four papers were given on various types of enzyme inhibitors. There was an attendance of 60.

The section committee elected Isaac Schour (University of Illinois) as vice-president and chairman of the section. The new committeeman-at-large is

Joseph Muhler (University of Indiana). Plans were laid for the next meeting in Indianapolis, and the subject chosen for discussion is "The physiology and pharmacologic aspects of fluorine." The date of the meeting will be 28 Dec. 1957.

R. W. BUNTING, *Secretary*

#### Pharmacy (Np)

Pharmacy Section Np held seven sessions 26 Dec. through 29 Dec. A total of 17 contributed papers on original studies were given, and two symposia and two panel discussions were held. More than 800 persons registered as having attended one or more of the pharmacy section meetings.

Of considerable interest, as was shown by an attendance in excess of 450, was the symposium and discussion on "Cosmetics," which attracted interest outside the pharmaceutical group. This session was cosponsored by the Committee on Cosmetics of the American Medical Association. Various aspects of cosmetic utilization were discussed by six experts in the field. Veronica Conley discussed the new role of cosmetics in everyday living, and Paul G. I. Lauffer discussed the scientific formulation of cosmetics. The essentials of skin cleansing were brought out by R. S. Suskind, and a paper on the control of axillary sweating and body odors was presented by Marion B. Sulzberger and Franz Herrmann. The present status of pigment-forming drugs was covered from the standpoint of chemical structure and activity by A. B. Lerner. Some of the toxicity problems encountered in the use of cosmetics were called to the attention of the group by B. E. Conley. A very interesting and lively discussion of various cosmetic problems followed, with I. H. Blank, S. Rothman, C. Nelson, and H. T. Behrman participating.

More than 150 pharmaceutical scientists attended a 4-hour panel discussion on the problems of compressed tablet coatings. P. Wilcox discussed the history of tablet coatings and some of the general problems involved. He was followed by four speakers who had had firsthand experience with the operation of different coating machines. Each speaker summarized the operation, advantages, and disadvantages of a particular machine and followed this with a film showing the precise operation. J. Cooper, V. H. Hostetler, W. Madison, and A. Mattocks participated.

The pharmacy section also cosponsored a symposium on "Antienzymes" with the chemistry, dentistry, and medical sciences sections participating. Of particular interest to the pharmaceutical scientists was the discussion of "Insulinase inhibitors" by Arthur Mirsky.

R. H. Blythe (Smith, Kline, and French Laboratories), chairman of the section, opened the contributed papers sessions with a stimulating discussion of the importance of the pharmacy section in the AAAS. He clearly pointed out the importance of a common meeting ground for the various scientific disciplines. The scientific papers presented were of unusual merit. L. Chavkin (Columbia University) reported on tablet coatings designed for timed disintegration. A study of the stability of sulfadiazine sodium injection as done at Temple University was discussed by J. Autian. Stabilized peroxides were discussed by H. M. Cobe (Temple University). M. J. Rodman presented the interesting convulsant and antaleptic actions of anisatin. J. E. Christian (Purdue University) discussed the polarography of adrenergic blocking agents and nitrogen mustards. K. J. Master and G. L. Jenkins reported their work on the hemoglobin regeneration of iron compounds. Human blood and urine concentrations following administrations of sulfaethylthiadiazole were discussed by J. V. Swintosky (Smith, Kline, and French Laboratories).

The hospital pharmacy group had a very interesting, well-attended, and spirited full-day session, under the direction of G. F. Archambault (U.S. Public Health Service). Several important subjects were presented, including the law-imposed responsibilities on the hospital pharmacist, a professional degree for hospital pharmacists, cost data of injectables, scientific management of drug and pharmaceutical resources, narcotic-hypnotic control systems, and the use of investigational drugs in hospitals. A panel discussion of the papers was then held with the following participants: Paul Parker, Newell Stewart, Fred Lascoff, R. Zimmerman, Joseph Oddis, Robert Bogash, Herbert Flack, and E. E. Leuallen. Luncheon, entertainment, and dinner were sponsored by Squibb, Wyeth, and Pfizer, respectively.

JOHN E. CHRISTIAN, *Secretary*

#### Agriculture (Section O)

"Grasslands in our national life" was the theme of the Section O meetings. The section chairman, Howard B. Sprague (Pennsylvania State University), arranged a four-session symposium on grasslands, and in addition there were six sessions for contributed papers. Seventeen scientific societies were listed as cosponsors and eleven agencies as endorsers. Section O cosponsored a program on "Ecology of grasslands," arranged by the Ecological Society of America; another on "Grassland climatology," by the American Meteorological Society; and

one on "Range management," by the American Society of Range Management. In all, there were 13 half-day sessions, including some 67 papers and one movie dealing with various phases of the grasslands problem.

Grasslands are very important in American agriculture as a source of feed for livestock. Various societies have discussed different phases of the problem. However, it was felt that there was need for an across-the-board consideration of the subject. This was kept in mind in arranging the program, which included outstanding speakers from all parts of the United States from Vermont to Arizona and from Florida to Washington.

The workers in the various fields discussed current research and the need for more work in many areas. The climate, soils, ecology, fertilizers, and irrigation methods for good grasslands were considered. Seedbed preparation, seeding, care, management, and harvesting of forage and seed were reviewed in detail. The question of plant improvement and the seriousness of diseases and insects were considered. The importance of forage quality, the proper management of livestock, and livestock parasites were given attention. One session was devoted to the economics of grasslands, and another to the machines available for proper maintenance, harvesting, and feeding.

As research in this area continues, still greater progress will be made. Meetings such as these should do much to acquaint workers in various fields with what is being done and what should be done. In spite of concurrent sessions, attendance ranged from 40 to more than 100 per session.

K. S. QUISENBERRY, *Secretary*

#### Education (Section Q)

Section Q continued in its policy of joining with other organizations to co-sponsor programs of mutual interest. Under this arrangement, the following sessions were sponsored: two panels on gifted children with the International Council for Exceptional Children; an address and a panel presentation on gifted children with the National Association for Gifted Children, and two symposia, one on "Testing for the professions" and one on "Scientists and education," with the American Educational Research Association. In addition, there were three sessions of general papers.

The teaching societies, NABT, NARST, NSTA, and ANSS, set up an outstanding series of programs, including symposia, addresses, field trips, and demonstrations. The societies also joined with the AAAS Cooperative Committee on the Teaching of Science and Mathematics to sponsor a

panel on "Proposals for meeting the science teaching manpower crisis."

The many fine AAAS programs created a real competition among the various offerings. Thus, attendance at some sessions was not large, although participation from the floor was thereby encouraged and resulted in some vigorous discussions. The vice-presidential address delivered by Dean A. Worcester was a stimulating and provocative paper entitled "A backward glance into the future." A business meeting for Section Q was held following the vice-presidential address.

HERBERT A. SMITH, *Secretary*

#### National Association for Gifted Children (Q4)

On 26 Dec. a paper titled "The needs of today's gifted children" was presented by Ann F. Isaacs (Personality Development Preschool). It was indicated that the gifted child should be identified from four points of view: by his parents, by his teachers, to his peers, and to himself. Parents must identify the gifted child because they have the first and most intimate contact with the child for the most extended length of time. Teachers should know the gifted child because they are in position to influence the child's attitudes toward school and the amount of schooling he will be motivated to seek. The peer group should identify the gifted child in order that he may be encouraged rather than feel the desire to suppress his talents in his search for group acceptance. The individual must know that he himself is talented in order that he may develop a sense of responsibility and the desire to develop his potentialities to the fullest, both for his own self-realization and the benefit of society.

On 27 Dec. papers were presented on the topic of "Motivating the gifted underachiever." Doris T. Allen (University of Cincinnati) pointed out that in terms of the problems of world peace, we are all underachievers. Louis T. Fliegler (Syracuse University) discussed the problem from the point of view of personality dynamics, and how case studies have shown that the child's attitudes toward himself and those of his parents influence his achievement.

John Mayor (Science Teaching Improvement Program, AAAS) approached the problem from the subject-matter aspect. He indicated that the subject might be regarded from the point of view of aiding the underachiever through curriculum changes, guidance, extracurricular activities, and the new force of professional societies that are concerned with studying ways to bring about improvement in public education.

John Person (Rochester State Hospital) presented a paper stressing the potential influence of adequate guidance of the underachiever. He indicated that these children sometimes do not achieve because they are unaware of their capacities and the value of adequate college training in terms of their future life's earnings.

Leah Gold Fein (Stamford, Conn.) and Viola Cassidy (Ohio State University) were discussants of the papers presented. Ann F. Isaacs acted as moderator.

ANN F. ISAACS, *President*

#### Junior Scientists Assembly (X1)

On 27 Dec. more than a thousand high-school students from the metropolitan area of New York City and as far away as Allentown, Pa., converged on the American Museum of Natural History to attend the tenth annual Junior Scientists Assembly sponsored by AAAS and the Academy Conference. In the morning, these students attended a special exhibit where 15 first-prize-winning projects of the New York Science Fair of 1956 were on display.

In the afternoon, 1100 ticket-holders gathered in the museum auditorium to receive packets of science-career materials and to enjoy the prepared 3-hour program.

Paul B. Sears, president of AAAS, opened the assembly with an address on the "Fellowship of science." Sears traced back his own career to his boyhood experiences on the family farm and an awakened curiosity in the common, ordinary things around him. He emphasized the importance of communication as an integral part of a scientist's work—"An observation or an experiment does not become 'science' until you have told someone about it." Hence, the importance of learning to speak and write well, to listen well, and to read well. He also stressed the importance of individual initiative in learning. "Nobody can learn anything for you; you must learn it yourself."

Don Herbert, the progress reporter of General Electric Theater on C.B.S. and "Mr. Wizard" on N.B.C., focused on curiosity as a common characteristic of all scientists. Much to the amusement and amazement, especially of the younger members, of his audience, Herbert demonstrated a number of very "curious" phenomena, using such "apparatus" as a soda bottle, a drinking straw, and the belt from his own trousers.

"What makes a scientist?" was the subject of discussion by a panel consisting of two young scientists, two students, and two science teachers. Paul Witty (Northwestern University) served as the mod-



erator. The discussion stimulated several pointed questions from members of the audience.

The program reached its climax with the scintillating demonstrations of Hubert N. Alyea (Princeton University). Amid bubbling fluids, changing colors, flashing lights, and burning jets; between sparks, fumes, and explosions, Alyea animatedly related how luck and accident favor the prepared mind. At the end of Alyea's talk, the repeated announcement that the assembly was over meant *nothing* to the hundred or more wide-eyed youngsters who crowded around the stage bombarding Alyea with questions until he was rescued by the custodian who came to close the building. From all indications the assembly was a "hit."

ZACHARIAH SABARSKY,  
Program Chairman

### Academy Conference (X1)

The business meeting of the Academy Conference of the AAAS was held 29 Dec., with Father P. H. Yancey, president, presiding. Representatives of 27 of the 41 state and city academies of science were present. Committee reports were given and reports of academy activities were presented by the official representatives of the academies. The resignation of Ralph W. Lefler, president-elect, was accepted, since he expects to be out of the United States during 1957.

Lefler presided at the afternoon session. I. E. Wallen, assistant director of AAAS Science Teaching Improvement Program, gave a progress report. J. A. Campbell, project director for operations, education in the sciences, National Science Foundation; Lyell Thomas, University of Illinois; and Thelma C. Heatwole, secretary of the academy conference, participated in a panel discussion on "What the Federal Government could do for academies of science."

Thirty academy representatives and guests were present at the academy conference dinner in the evening. C. L. Baker, Southwestern College, Memphis, Tenn., served as toastmaster for the occasion. Father Yancey gave the presidential address, a delightfully sincere and informative talk on "The role of academies of science and of the academy conference in the scientific program."

THELMA C. HEATWOLE, *Secretary*

### American Association of Scientific Workers (X2)

Any broad discussion of planning must necessarily produce platitudes and generalities, but the particular purpose of the meeting on "Science and planning"

was to relate these generalities to the contribution that has been, and can be, made by the various scientific disciplines. To this end, the keynote speaker, Hans Blumenfeld, related past progress in planning to the advances in particular scientific fields. In turn, public health, sanitation, microbiology, hydrology, statistics, and other disciplines were shown as sources of knowledge which permitted the planner to remedy or control different elements of urban development. Solutions to problems such as epidemic disease, accentuated by space concentration, removed limits to urban growth, while advances in power technology removed limitations on the choice of site. Thus, the past flow of knowledge from scientist to planner has been reasonably direct; today, however, such single-purpose transfer of information is no longer adequate for urban development. Instead, a comprehensive approach, involving a continued high level of contribution from the natural sciences and a rapidly increasing application of social science, seems essential.

Discussing the contribution of the physical sciences, Frank Herring described the interplay of advances in power generation and distribution, communication, and transportation which have virtually eliminated site and size considerations and substituted space design as the key planning problem. But again it was made clear that technology alone is insufficient to insure progress; improved roads, space layouts, power transmission, distribution facilities, and so forth, no longer guaranteed the effectiveness of planning. New parameters, such as the effect of the pace of life, the scale of endeavor, and the character and spirit of the population strongly influenced the attainment of planning goals.

Thus, contemporary planning requires closer attention to the less tangible and predictable areas covered by the social sciences. Stressing that today's planning actions will influence social, political, and economic decisions well into the future, Burnham Kelly regarded planning by "belief and experience" as outmoded. In its place, maximum application of social science is mandatory, if flexible long-range plans based on scientific estimates of the consequences of given alternatives, both in social and economic terms, are to be achieved. In particular, science is asked to provide a frame of reference, physical and social, so that planning decisions do not quickly produce a new set of problems which negate the goals of the plan.

It is obvious that the requirements and deficiencies are the most precise at the neighborhood level. Social distortions based on racial, religious, economic, and other criteria of status and rank were seen

as major factors affecting the situation. Drayton Bryant noted that these were a major contribution to the "blighting" of urban areas, which could be controlled only by the development of "self-regenerating" neighborhoods, stable to factors such as mobility, alteration of economic status, and racial composition, and self-regulating with regard to maintenance, crowding, levels of service, and community facilities. Accommodation of the additional 50 million urban dwellers predicted for the year 2000 makes the need more urgent and requires scientific approaches which will prevent "reblighting" by that time. Resources several times the present 10 percent of each tax dollar must be available to the cities if the job is to be done; at least some portion of this should be devoted to research in the specific areas needed for community planning.

ROBERT RUTMAN, *Secretary*

### American Documentation Institute (X3)

The fourth annual meeting was held in New York on 28 and 29 Dec. The theme of the meeting was the broadening interests of documentalists. The opening session entitled "Language, logic, and logistics of documentation" was chaired by James W. Perry (Western Reserve University), the new president of ADI. There were papers by an M.I.T. linguist, Noam Chomsky, by a logician of the Hebrew University, Israel, Yehoshua Bar-Hillel (read by another in his absence), and by J. W. Perry.

At the business meeting, Herman H. Henkle (Crerar Library, Chicago) was elected ADI president for 1958. An International Conference on Scientific Information is to be held in this country in November 1958, in cosponsorship with the National Academy of Sciences, the National Research Council, and the National Science Foundation. The next annual meeting of ADI will be in Chicago, November 1957.

There were two concurrent sessions on 29 Dec., with a total of 16 talks. The chairmen were G. Miles Conrad (Biological Abstracts) and Richard Gremling (Bell Telephone Laboratories). The subjects varied from reports on installations, such as "A punch card code for cardiovascular pathology" at the National Research Council and "Mechanized linguistic analysis" at the IBM World Trade Organization, to predictions of things to come, such as the "Rapid selector and optical disc memories as applied to document search" by Jacob Rabinow. History was covered by Calvin Mooers in "The debt of documentation to some forgotten inventors."



The ADI panel on "Changing patterns of information organization" was cosponsored by the Association for Computing Machinery. The panel consisted of eminent librarians and computer experts: S. M. Alexander (NBS), R. S. Angell (LC), C. L. Bernier (CA), H. P. Luhn (IBM), J. W. Mauchly (UNIVAC), and M. F. Tauber (CU). The panel discussed how librarians/indexers could provide engineers with a specification of their searching problems, so that an adequate machine working model could be constructed.

LEA M. BOHNERT, *Program Chairman*

#### American Nature Study Society (X6)

The American Nature Study Society inaugurated its 50th-anniversary celebration in New York City, where it was founded in December 1908, with Liberty Hyde Bailey as its first president, and made special anniversary plans for next year's meeting in Indianapolis. The meeting highlights included four well-attended program sessions, a banquet, and a field trip to Stamford and Greenwich, Conn.

The following speakers discussed "New approaches to conservation": William Clement (Cortland, N.Y.), E. L. Palmer (Ithaca, N.Y.), Fairfield Osborn (New York City), Richard Westwood (Washington, D.C.), and Stanley A. Cain (Ann Arbor, Mich.). Four naturalists described various aspects of natural history of the New York City region: Richard B. Fischer, Steven Collins, Roger Tory Peterson, and John Kieran.

A third panel consisted of a textile designer, Virginia Eckelberry, who uses nature designs in fabrics; a bird artist, Don Eckelberry, who described the art of bird painting; a college teacher, Stanley Mulaik, who captures and analyzes the various sounds in nature; a textbook writer, Herman Schneider, who suggests simple ways of interesting children in science and nature; and a medical doctor, Glidden Baldwin, who traveled 3 months in Africa and captured nature scenes on 10 miles of colored film. Five other nature and camping leaders showed how nature study can be highlighted in camping. They were Helen Ross, Dorothy Treat, Howard Weaver, L. B. Sharp, and Ted Pettit. Edwin Way Teale gave an illustrated lecture on *Autumn across America*, the title of his best-selling volume, at the annual banquet.

The field trip to the Stamford Museum, Audubon Nature Center, and North Mianus Gorge was arranged and led by Charles Mohr, Mr. and Mrs. Anthony Anable, Ernest Luhde, Leonard Bradley, and Dorothy Treat.

RICHARD L. WEAVER,  
*Program Chairman*

#### Conference on Scientific Manpower (X9)

Howard L. Bevis, chairman of the National Committee for the Development of Scientists and Engineers, was the principal speaker at the Conference on Scientific Manpower session held on 26 Dec. In reporting on the program of the national committee, Bevis noted particularly that its membership was composed of the current heads of some 19 nongovernment organizations. The committee's effort is to mobilize the resources of its constituent organizations to produce more qualified scientists and engineers than are presently being trained.

Paul B. Sears presided at the session. Formal discussants included J. C. Warner (Carnegie Tech), who stressed the quality aspects of training. He proposed early identification of gifted students, their early training in science and mathematics, and provision for financial assistance if required for their higher education. For improvement in the short-run, he recommended effective utilization of our engineers, particularly through the use of technical aides. Earl P. Stevenson (Arthur D. Little, Inc.) stressed the importance of three principal areas of committee concern—that is, improved utilization of present scientists and engineers, better secondary-school training, and the greater use of technical assistants. Milton O. Lee (Federation of American Societies for Experimental Biology), speaking for the biological sciences, noted the emerging shortages of biologists. Again, secondary-school training in mathematics and science, particularly in chemistry and physics, was considered of prime importance. Additional fellowship support was also believed particularly important in this field, which is increasingly requiring substantial post-Ph.D. training.

Papers delivered at the conference are being collected for publication by the National Science Foundation. A limited number of copies will be available for distribution by that agency.

THOMAS J. MILLS, *Program Director*

#### New York Academy of Sciences (X14)

The symposium on "Modern ideas on spontaneous generation" was held by the Section of Biology, New York Academy of Sciences, in collaboration with Section F, AAAS on 26 Dec. Harold Blum (National Institutes of Health) gave the introductory remarks and presided over the morning session, which included the following: "Formation of organic compounds on the primitive earth," Stanley L. Miller (College of Physicians and Surgeons, Columbia University); "Paleobiology," Philip H. Abelson (Carnegie Institution of Washington); "Electrolytic requirements of protists and archaeo-metabolism," Seymour H. Hutner, Marvin Sanders, and J. J. A. McLaughlin (Haskins Laboratories); "Speculations on origins and evolutions in photosynthesis," Sam Granick (Rockefeller Institute for Medical Research).

George Wald (Harvard University) was the chairman for the afternoon session. The subjects and speakers were: "Phosphorus and the origin of life," Addison Gulick (Cambridge, Mass.); "Interaction of synthetic polynucleotides," Robert C. Warner (New York University College of Medicine); "The structure of crystalline proteins," David Harker (Polytechnic Institute of Brooklyn); "Spontaneous generation of protein and anabolic pathways," Sidney W. Fox (Florida State University); "The gene as the prime mover," Carl C. Lindegren (Southern Illinois University); "The assumptions underlying discussions about the origin of life," N. W. Pirie (Rothamsted Experimental Station, England). Owing to lack of time, Pirie's paper was not given in full. The concluding remarks were given by Wald.

The papers presented at this meeting will be published in the *Annals of the New York Academy of Sciences* and should be ready for distribution sometime this year, free to the members of the academy and at a nominal charge to nonmembers.

Although some old themes were rehearsed, a considerable amount of new material, experimental evidence, and provocative ideas on spontaneous generation were presented. The symposium was well received by the press, and there was a constant attendance of about 500 persons. The discussion from the floor was lively.

ROSS F. NIGRELLI,  
*Conference Chairman*



## Meetings and Societies

### Arid-Zone Climatology

The Australia-UNESCO Symposium on Arid Zone Climatology was held in Canberra, Australia, 17 to 20 Oct. 1956. It was followed by a 4-day study tour to Broken Hill, Mildura, and to Melbourne that was arranged by the Commonwealth Scientific and Industrial Research Organization. More than 40 scientists from Australia contributed, and nearly 30 from overseas. The delegates from the United States were C. W. Thornthwaite (chairman of the symposium), A. J. Drummond, Knut Schmidt-Nielsen, and F. A. Brooks. All the papers were preprinted; hence only 5 minutes were allowed each author, the main focus being on international discussion of each topic which, though limited by the time schedule (rigidly adhered to), was extremely interesting, especially to scientists working in fringe areas.

The Australian contributions to the technical sessions were supplemented with appropriate papers from the overseas delegates; a very thorough coverage was obtained on each major topic. The technical sessions covered the following subjects: "Evaporation and the water balance," "Radiation and the thermal balance," "Interrelationships of climatic elements and flora," "Interrelationships of climatic elements and fauna," "Microclimate of man and domestic animals," "Modification of microclimate," "Salt-ing and chemistry of rain water," and "Climatological observational requirements in arid zones."

Because of expense, only a few of the Australians were allowed to participate in the 4-day study tour, all of which was very interesting, including the flood whose crest takes 3 months to travel downstream. The various objectives cannot all be mentioned here, but outstanding were the use of cetyl alcohol on a large reservoir to reduce evaporation; the natural regeneration of ground cover when it is protected only from rabbits and livestock; the Mildara winery; and the whole research station of the Division of Meteorological Physics, where very advanced work is being carried on in heat- and moisture-transfer phenomena. Two minor questions raised lively discussion: (i) whether the Witchetty grub

is edible and (ii) whether we were seeing the crescent of the new moon on the wrong side. The former was settled by demonstration.

All the delegates were very appreciative of the excellent arrangements and cordial hospitality. Questions concerning the proceedings, which are to be published soon, should be addressed to Mr. J. Swarbrick, Secretary, UNESCO Commission on Arid Lands, 19 Avenue Kléber, Paris 16, France.

F. A. BROOKS

*Department of Agricultural Engineering,  
University of California, Davis*

### Biological Aging

A conference of 50 U.S. and foreign biologists will be held 2-3 May to discuss research problems in the area of biological aging. The meeting, which is supported by a grant from the National Science Foundation, will take place at Gatlinburg, Tenn., under the auspices of the American Institute of Biological Sciences. Participation will be strictly limited to those invited.

Participants are to be asked to prepare short papers for circulation to the other participants in advance of the meeting, and no formal presentations will be made at the meeting itself, which will be reserved for discussion. Anyone who is seriously engaged in work on aging and is desirous of participating in the conference should communicate promptly with the AIBS (2000 P St., NW, Washington 6, D.C.). Concise information about the nature of the applicant's work on aging should be supplied. Invitations to the conference will be issued by the AIBS Committee for Basic Biological Research on Aging.

### Meteorology and Hydrometeorology

The 151st national meeting of the American Meteorological Society and Conference on Hydrometeorology will be held in Eckhart Hall of the University of Chicago, 19-21 Mar. The two sessions on 19 Mar. will deal with problems of atmospheric pollution: in the morning the general problem of atmospheric pol-

lution and diffusion will be considered; the afternoon session will be devoted to various aspects of radioactive particles, their diffusion and removal from the atmosphere.

On the evening of 20 Mar. Willard Libby of the Atomic Energy Commission will be the chief speaker at a banquet to be held in the Quadrangle Club. He will discuss "Nuclear reactions in nature."

### Society Elections

■ American Nature Study Society: pres., Richard L. Weaver, University of Michigan; v. pres., Seymour Fowler, Iowa State Teachers College; sec., Helen Ross, Fitchburg (Mass.) State Teachers College; treas., Howard Weaver, University of Illinois.

■ American Society of Professional Biologists, Inc.: pres., Albert Dickman, Dickman Laboratories; pres.-elect, James R. Foster, University of Maryland; past pres., Austin W. Morrill, Jr.; treas., Harriette D. Vera; exec. sec., Alfred F. Borg, Gardner Hall, North Carolina State College. The vice presidents are Hubert Heitman (western), H. Mac Vandiviere (southern), Harold M. Kaplan (central), Carl R. Fellers (northeastern).

■ Scientific Manpower Commission: pres., John S. Nicholas, Yale University; v. pres., B. R. Stanerson, American Chemical Society; sec.-treas., Glen Finch, National Academy of Sciences.

■ American Institute of Electrical Engineers: pres., Walter J. Barrett, New Jersey Bell Telephone Company; treas., L. F. Hickernell, Anaconda Wire and Cable Company. The vice presidents are Benjamin R. Teare, Jr., Robert W. Oettinger, Albert G. Johnson, Orien A. Gustafson, and Gordon F. Tracy.

### Forthcoming Events

#### March

13-15. Society of Exploration Geophysicists, 10th annual midwestern, Fort Worth, Tex. (G. A. Grimm, Tide Water Associated Oil Co., Box 2131, Midland, Tex.)

14. Effect of Radiation on Foods, Assoc. of Vitamin Chemists, Chicago, Ill. (M. Freed, Dawe's Laboratories, Inc., 4800 S. Richmond St., Chicago 32.)

15. Fats in Human Nutrition, AMA symp., New Orleans, La. (Council on Foods and Nutrition, American Medical Assoc., 535 North Dearborn, Chicago 10, Ill.)

15-17. Society of Women Engineers, annual, Houston, Tex. (SWE, Newsletter, 516 Climax St., Pittsburgh 10, Pa.)

18-21. Institute of Radio Engineers, natl. convention, New York, N.Y. (B. Warriner, IRE, 1 E. 79 St., New York 21.)

19-21. American Meteorological Soc., 151st national, Chicago, Ill. (K. C. Spengler, AMS, 3 Joy St., Boston 8, Mass.)

20-22. National Health Forum, Cincinnati, Ohio. (National Health Council, 1790 Broadway, New York 19.)

20-23. National Science Teachers Assoc., annual, Cleveland, Ohio. (R. H. Carleton, NSTA, 1201 16 St., NW, Washington 6.)

21-23. American Physical Soc., Philadelphia, Pa. (K. K. Darrow, APS, Columbia Univ., New York 27, N.Y.)

21-23. International Assoc. for Dental Research, annual, Atlantic City, N.J. (D. Y. Burrill, 129 E. Broadway, Louisville 2, Ky.)

21-23. Michigan Acad. of Science, Arts and Letters, annual, Detroit, Mich. (R. F. Haugh, Dept. of English, Univ. of Michigan, Ann Arbor.)

22-23. Heart: Law-Medicine Problem, Cleveland, Ohio. (O. Schroeder, Jr., Law-Medicine Center, Western Reserve Univ., Cleveland 6.)

23-28. American Soc. of Tool Engineers, 25th annual, Houston, Tex. (R. Gebers, 10700 Puritan, Detroit 38, Michigan.)

24-27. American Assoc. of Dental Schools, annual, Atlantic City, N.J. (M.

W. McCrea, 42 S. Greene St., Baltimore 1, Md.)

25-28. American Acad. of General Practice, 9th annual scientific assembly, St. Louis, Mo. (M. F. Cahal, AAGP, Volker Blvd. at Brookside, Kansas City 12, Mo.)

25-29. International College of Allergy, 3rd symposium, London, England. (W. Kaufman, 540 Brooklawn Ave., Bridgeport 4, Conn.)

25-29. Western Metal Exposition and Congress, 10th, Los Angeles, Calif. (W. H. Eisenman, 7301 Euclid Ave., Cleveland 3, Ohio.)

26-28. Mechanisms for the Development of Drug Resistance in Microorganisms, Ciba Foundation Symp. (by invitation), London, England. (G. E. W. Wolstenholme, 41 Portland Pl., London, W.1.)

26-28. Weather Radar Conf., 6th, sponsored by American Meteorological Soc., Cambridge, Mass. (K. C. Spengler, 3 Joy St., Boston 8, Mass.)

27-29. American Power Conf., 19th annual, Chicago, Ill. (R. A. Budenholzer, Illinois Inst. of Technology, 35 W. 33 St., Chicago 16.)

27-29. Effects of Radiation on Materials, colloquium, Baltimore, Md. (Office of Naval Research, Glenn L. Martin Co., Baltimore 3.)

27-29. National Committee on Alcoholism, annual, Chicago, Ill. (Miss E. Jensen, NCA, 2 E. 103 St., New York 29.)

## April

1-2. Industrial Engineering Conf., West Lafayette, Ind. (K. E. Glancy, Div. of Adult Education, Purdue Univ., West Lafayette.)

1-4. American Assoc. of Petroleum Geologists, 42nd annual, St. Louis, Mo. (R. H. Dott, AAPG, Box 979, Tulsa, Okla.)

1-4. International Anesthesia Research Soc., cong., Phoenix, Ariz. (A. W. Friend, Wade Park Manor, Cleveland 6, Ohio.)

1-4. Society of Economic Paleontologists and Mineralogists, annual, St. Louis, Mo. (C. P. Ellison, Jr., Dept. of Geology, Univ. of Texas, Austin.)

1-5. Assoc. of American Geographers, annual, Cincinnati, Ohio. (B. W. Adkinson, Reference Dept., Library of Congress, Washington 25.)

2-3. Future Developments in Food Preservation, symp., Kansas City, Mo. (Food Symposium, Midwest Research Inst., 425 Volker Blvd., Kansas City 10.)

4-5. Dietary Fats—Helpful or Harmful, 3rd annual nutrition conf., Detroit, Mich. (A. H. Smith, Wayne State Univ. College of Medicine, Detroit 7.)

4-6. American Rocket Soc., spring, Washington, D.C. (A. G. Haley, 1735 De Sales St., NW, Washington 6.)

5-6. American Mathematical Soc., New York, N.Y. (J. H. Curtiss, AMS, 190 Hope St., Providence 6, R.I.)

7-10. Pan American Assoc. of Ophthalmology, 4th interim cong., New York, N.Y. (B. F. Payne, 17 E. 72 St., New York 21.)

7-12. American Chemical Soc., Miami, Fla. (A. H. Emery, ACS, 1155 16 St., NW, Washington 6.)

8. Phi Lambda Upsilon, Miami, Fla. (T. B. Cameron, Dept. of Chemistry, Univ. of Cincinnati, Cincinnati 21, Ohio.)

8-10. American Soc. of Mechanical Engineers, spring, Birmingham, Ala. (C. E. Davies, ASME, 29 W. 39 St., New York 18.)

8-12. Food Bacteriology, internatl. symp., Cambridge, England. (Dr. Mossel, Central Inst. for Nutrition Research T.N.O., Catharijnesingel 61, Utrecht, Netherlands.)

8-12. Surface Activity, 2nd world cong., London, England. (Congress Secy., 14 Belgrave Sq., London, S.W. 1.)

9-10. Industrial Electronics Education Conf., annual, Chicago, Ill. (E. A. Roberts, Armour Research Foundation, Illinois Inst. of Technology, Chicago 16.)

10-12. Nuclear Instrumentation Conf., natl., Atlanta, Ga. (H. Kindler, Instrument Soc. of America, 313 Sixth Ave., Pittsburgh, Pa.)

10-13. Conference on Embryology and Experimental Morphology, Cambridge, England. (D. R. Newth, Dept. of Zoology, University College London, Gower St., London W.C. 1.)

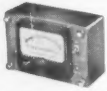



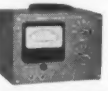
11-13. American Assoc. of Pathologists and Bacteriologists, annual, Washington D.C. (E. A. Gall, Cincinnati General Hospital, Cincinnati 29, Ohio.)

11-13. Southwestern Inst. of Radio Engineers Conf. and Electronics Show, 9th annual, with 2nd National Simulation Conf., Houston, Tex. (F. C. Smith, Jr., Box 13058, Houston 19.)

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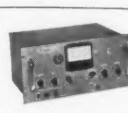
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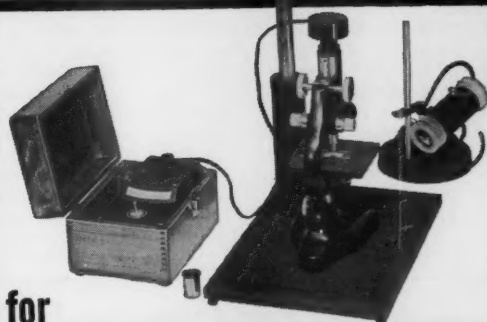
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12-13. Colorado-Wyoming Acad. of Science, annual, Fort Collins, Colo. (O. W. Olsen, Colorado A.&M. College, Fort Collins.)

12-13. Eastern Psychological Assoc., annual, New York, N.Y. (G. G. Lane, Dept. of Psychology, Univ. of Delaware, Newark.)

12-13. New Orleans Acad. of Sciences, New Orleans, La. (A. Welden, Dept. of Biology, Newcomb College, New Orleans.)

12-14. American Assoc. for Cancer Research, Chicago, Ill. (H. J. Creech, Inst. for Cancer Research, Fox Chase, Philadelphia 11, Pa.)

12-14. American Assoc. of Physical Anthropologists, annual, Ann Arbor, Mich. (J. H. Spuhler, Dept. of Human

Genetics, Univ. of Michigan Medical School, Ann Arbor.)

12-14. American Soc. of Human Genetics, annual, Ann Arbor, Mich. (E. J. Gardner, Dept. of Zoology, Utah State College, Logan.)

12-14. National Speleological Soc., Natural Bridge, Va. (Mrs. M. McKenzie, 1407 Hickory Ct., Broyhill Park, Falls Church, Va.)

13. Society for the Scientific Study of Religion, spring, New York, N.Y. (W. C. Clark, Hartford School of Religious Education, Hartford 5, Conn.)

13. South Carolina Academy of Science, annual, Columbia (Miss M. Hess, Box 114, Winthrop College, Rock Hill, S.C.)

14-16. Telemetering Symposium, natl.,

Philadelphia, Pa. (A. S. Westneat, Jr., Applied Science Corp., Box 44, Princeton, N.J.)

14-20. American Physiological Soc., Chicago, Ill. (M. O. Lee, APS, 9650 Wisconsin Ave., NW, Washington 14.)

15-17. American Soc. of Lubrication Engineers, annual, Detroit, Mich. (W. P. Youngclaus, Jr., ASLE, 84 E. Randolph St., Chicago 1, Ill.)

15-17. Molecular Mechanism of Rate Processes in Solids, Faraday Soc. discussion, Amsterdam, Netherlands. (Faraday Soc., 6 Gray's Inn Sq., London, W.C.1.)

15-17. Systems for Information Retrieval, symp., Cleveland, Ohio. (J. H. Shera, School of Library Science, Western Reserve Univ., Cleveland 6.)

15-18. American Personnel and Guidance Assoc. and constituent divisions: American College Personnel Assoc., American School Counselor Assoc., National Assoc. of Guidance Supervisors and Counselor Trainers, National Vocational Guidance Assoc., Student Personnel Assoc. for Teacher Education; Detroit, Mich. (A. A. Hitchcock, APGA, 1534 O St., NW, Washington 5.)

15-18. Host-Specificity and Parallel Evolution among Parasitic Insects and Worms, symp., Neuchatel, Switzerland. (J. G. Baer, C.P. 2, Neuchatel 7.)

15-18. International Inst. of Differing Civilizations, 30th session, Lisbon, Portugal. (11, Blvd. de Waterloo, Brussels, Belgium.)

15-19. American Assoc. of Immunologists, annual, Chicago, Ill. (F. S. Cheever, Graduate School of Public Health, Univ. of Pittsburgh, Pittsburgh 13, Pa.)

15-19. American Soc. for Experimental Pathology, annual, Chicago, Ill. (C. C. Erickson, Inst. of Pathology, Univ. of Tennessee, 858 Madison Ave., Memphis.)

15-19. American Soc. for Pharmacology and Experimental Therapeutics, Chicago, Ill. (H. Hodge, Dept. of Pharmacology, Univ. of Rochester, Rochester, N.Y.)

15-19. Federation of American Societies for Experimental Biology, annual, Chicago, Ill. (M. O. Lee, FASEB, 9650 Wisconsin Ave., Washington 14.)

15-19. High Energy Nuclear Physics Conf., 7th annual, Rochester, N.Y. (R. Marshak, Univ. of Rochester, Rochester.)

15-20. American Inst. of Nutrition, annual, Chicago, Ill. (R. W. Engel, Dept. of Biochemistry and Nutrition, Virginia Polytechnic Inst., Blacksburg 13, Va.)

16-18. Nuclear Tests for Nondestructive Testing Applications, symp., Chicago, Ill. (American Soc. for Testing Materials, 1916 Race St., Philadelphia 3, Pa.)

17-19. American Assoc. of Anatomists, annual, Baltimore, Md. (L. B. Flexner, School of Medicine, Univ. of Pennsylvania, Philadelphia 4.)

18-20. Assoc. of Southeastern Biologists, annual, Athens, Ga. (J. C. Dickinson, Jr., Univ. of Florida, Gainesville.)

18-20. Ohio Acad. of Science, annual, Bowling Green. (R. W. Dexter, Dept. of Biology, Kent State Univ., Kent, Ohio.)

18-20. Southern Soc. for Philosophy and Psychology, annual, Gatlinburg, Tenn. (W. B. Webb, U.S. Navy School of Aviation Medicine, Pensacola, Fla.)

18-20. Venereal Disease Postgrad. Conf., 26th, Memphis, Tenn. (H. Packer,

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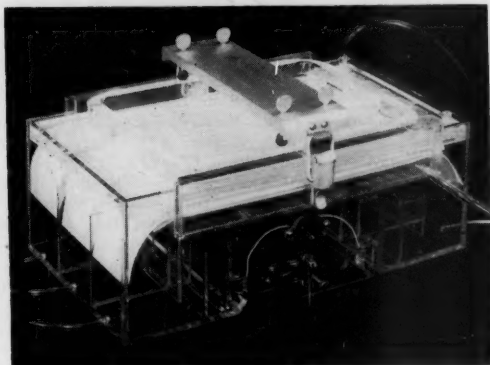
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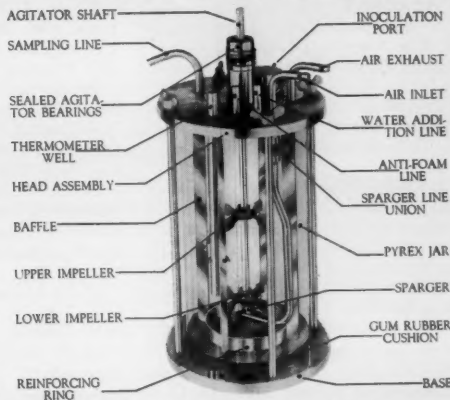
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Dept. of Preventive Medicine, Univ. of Tennessee College of Medicine, Memphis 3.)

19-20. Arkansas Acad. of Science, annual, Fayetteville. (L. F. Bailey, University of Arkansas, Fayetteville.)

19-20. Seismological Soc. of America, annual, Los Angeles, Calif. (P. Byerly, Bacon Hall, Univ. of California, Berkeley 4.)

22-24. National Acad. of Sciences, annual, Washington, D.C. (H. L. Dryden, NAS, 2101 Constitution Ave., NW, Washington 25.)

23-25. Chemistry and Biology of Mucopolysaccharides, Ciba Foundation Symp. (by invitation only), London, England. (G. E. W. Wolstenholme, 41 Portland Pl., London, W.1.)

23-25. Solid State Devices in Electric Circuits, symp., New York, N.Y. (J. Griesmann, Microwave Research Inst., 55 Johnson St., Brooklyn 1, N.Y.)

23-26. American Industrial Hygiene Assoc., annual, St. Louis, Mo. (G. D. Clayton, AIHA, 14125 Prevost, Detroit 27, Mich.)

23-27. Separation of Isotopes, colloquium of IUPAP, Amsterdam, Netherlands. (J. Kistemaker, Laboratorium voor Massaspectrografie, Hoogte Kadijk 202, Amsterdam C.)

24-25. Industrial Research Conf., Chicago, Ill. (C. E. Barthel, Armour Research Foundation, Illinois Inst. of Technology, 10 W. 35 St., Chicago 16.)

24-25. Recent Advances in the Study

of Venereal Disease, 8th annual symp., Washington, D.C. (W. J. Brown, Program Committee Chairman, Communicable Disease Center, Atlanta, Ga.)

24-26. Purity Control by Thermal Analysis, IUPAC, Amsterdam, Netherlands. (W. M. Smit, Central Inst. for Physico-Chemical Constants, Biltstraat 172, Utrecht, Netherlands.)

24-26. Sanitary Engineering Conf. on Solids Handling and Anaerobic Digestion, New York, N.Y. (W. W. Eckenfelder, Jr., Civil Engineering Dept., Manhattan College, New York 71.)

24-27. Plant Quality, 2nd internatl. colloquium, Paris, France. (L. Genevois, Faculté des Sciences, Université de Bordeaux, 20, Cours Pasteur, Bordeaux, France.)

25-26. Midwest Benthological Soc., annual, Urbana, Ill. (A. Lopinot, 205 W. Osie, Gillespie, Ill.)

25-27. American Physical Soc., Washington, D.C. (K. K. Darrow, APS, Columbia Univ., New York 27.)

25-29. Pan American Cancer Cytology Cong., Miami, Fla. (J. E. Ayre, New York Univ., New York, N.Y.)

26-27. Alabama Acad. of Science, annual, Jacksonville. (H. A. McCullough, Dept. of Biology, Howard College, Birmingham, Ala.)

26-27. American Assoc. of University Professors, annual, New York, N.Y. (R. F. Fuchs, AAUP, 1785 Massachusetts Ave., NW, Washington 6.)

26-27. Iowa Acad. of Science, annual,

Cedar Falls. (J. L. Laffoon, Dept. of Zoology and Entomology, Iowa State College, Ames.)

26-27. Kentucky Acad. of Science, Mammoth Cave. (G. Levey, Berea College, Berea, Ky.)

26-27. Mississippi Acad. of Sciences, annual, Columbus. (C. Q. Sheely, State College, Miss.)

26-27. Montana Academy of Sciences, 17th annual, Billings. (L. H. Harvey, Montana State Univ., Missoula.)

26-27. West Virginia Acad. of Science, annual, Keyser. (M. Ward, Glenville State College, Glenville, W. Va.)

28. American Soc. of Hospital Pharmacists, New York, N.Y. (Mrs. G. N. Francke, 1812 Norway Rd., Ann Arbor, Mich.)

28-30. American Assoc. of Colleges of Pharmacy, annual, New York, N.Y. (G. L. Webster, Univ. of Illinois College of Pharmacy, 808 S. Wood St., Chicago 12.)

28-2. Southwestern and Rocky Mountain Division-AAAS, annual, Tucson, Ariz. (F. E. E. Germann, 1800 Sunset Blvd., Boulder, Colo.)

28-3. American Pharmaceutical Assoc., annual, New York, N.Y. (R. P. Fischelis, APA, 2215 Constitution Ave., NW, Washington 7.)

28-3. Soc. of American Bacteriologists, annual, Detroit, Mich. (J. H. Bailey, Sterling-Winthrop Research Inst., Rensselaer, N.Y.)

29-30. National Assoc. of Boards of Pharmacy, annual, New York, N.Y. (P. H. Costello, NABP, 77 W. Washington St., Chicago 2, Ill.)

29-1. American Assoc. of Spectrographers, 8th annual, Chicago, Ill. (T. H. Zink, H. Cohn & Sons, 4528 W. Division St., Chicago 51.)

29-1. American Geophysical Union, 38th annual, Washington, D.C. (W. E. Smith, AGU, 1515 Massachusetts Ave., NW, Washington 5.)

29-1. American Oil Chemists' Soc., 48th annual, New Orleans, La. (R. T. O'Connor, Southern Regional Research Laboratory, New Orleans.)

29-2. International Acad. of Proctology, 9th annual, New York, N.Y. (A. J. Cantor, IAP, 147-41 Sanford Ave., Flushing 55, L.I.)

29-4. Irrigation and Drainage, 3rd internatl. cong., San Francisco, Calif. (W. E. Blomgren, 260 Leetsdale Dr., Denver 22, Colo.)

30-1. Metal Powder Assoc., 13th annual, Chicago, Ill. (MPA, 130 W. 42 St., New York 36.)

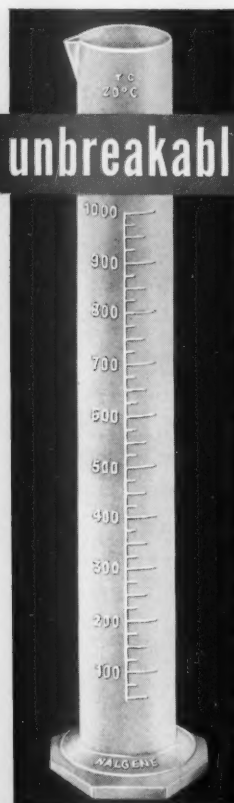
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1-3. Electronic Components Conf., Chicago, Ill. (R. M. Soria, 1830 S. 54 Ave., Chicago 50.)

1-3. Society for Experimental Stress Analysis, spring, Boston, Mass. (W. M. Murray, SESA, P.O. Box 168, Cambridge 39, Mass.)

2-4. American Philosophical Assoc., annual, Chicago, Ill. (W. H. Hay, Bascom Hall, Univ. of Wisconsin, Madison 6.)

2-4. Illinois State Acad. of Science, annual, Normal. (R. A. Evers, Illinois Natural History Survey, Urbana.)



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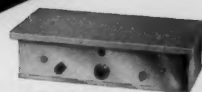
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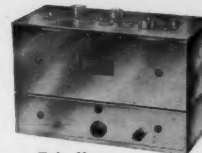
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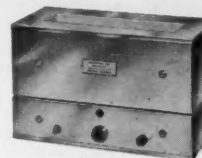
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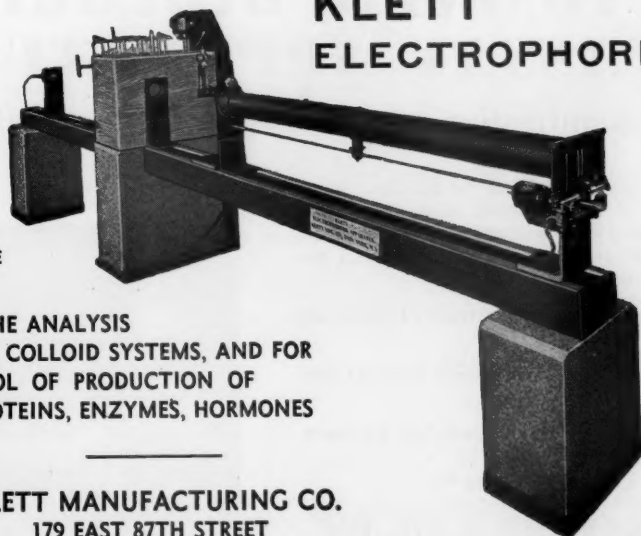
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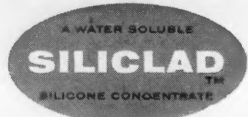
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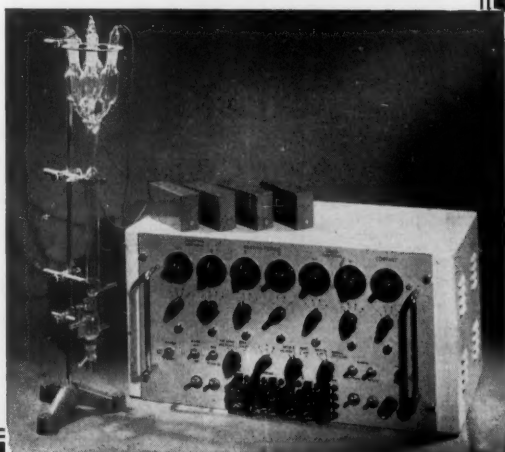
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The editors take no responsibility for the content of the letters published in this section. Anonymous letters will not be considered. Letters intended for publication should be typewritten double-spaced and submitted in duplicate. A letter writer should indicate clearly whether or not his letter is submitted for publication. For additional information, see *Science* 124, 249 (10 Aug. 1956).

### Deep-Sea Diving Record

I read with interest the item entitled "Deep-sea diving record" [*Science* 124, 1141 (7 Dec. 1956)]. The dive to 600 feet is a notable achievement. May I, however, correct the statement that "The use of this mixture [oxygen and helium] is new"? The early history of the use of this mixture has been given in a U.S. Bureau of Mines Circular [No. 2670 (Feb. 1925)]; in *Nature* [121, 577 (1928)] by Hildebrand, Sayers, and Yant; and in *Science* [65, 324 (1927)] by Hildebrand.

The submarine *Squalus* was salvaged by aid of this mixture in 1939 [Behnke and Willman, *U.S. Naval Med. Bull.* 37, No. 4 (1939)]. Max E. Nohl dived to 420 feet in Lake Michigan on 1 Dec. 1937. The preliminary work was described by Edgar M. End and M. E. Nohl [*Marquette Med. Rev.* No. 2, 53, (1938)]. There is enough credit to distribute among all who have contributed to the present status of deep diving with helium and oxygen.

JOEL H. HILDEBRAND

Department of Chemistry  
and Chemical Engineering,  
University of California, Berkeley

### Gross National Product

I wish to call attention to what appear to be seriously misleading figures in Glenn T. Seaborg's article, "The future through science" [*Science* 124, 1275 (28 Dec. 1956)].

At the end of the second paragraph, which is concerned with the physical well-being and growth of the United States, figures are given which purport to represent the growth of our "gross national product of goods and services" and show a more than sixfold increase from 1933 to 1955 and a more than fourfold increase from 1939 to 1955. The official Government figures show only a threefold increase in the "gross national product of goods and services" between 1933 and 1955 and only a doubling from 1939 to 1955. The actual figures for Gross National Product in constant 1947 dollars are as follows: 1933, \$103.7 billion; 1939, \$157.5 billion; 1955, \$318.8 billion [*National Income—1954 Edition* (U.S. Dept. of Commerce), p. 216; and *Survey of Current Business* (U.S. Dept. of Commerce, Feb. 1956), p. 7].



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I presume that Seaborg used the raw figures for gross national product without any adjustment for the big rise in prices which has taken place, particularly since 1939. Because of the price difference, the rise in the money value of gross national product bears little relationship to increases in the actual production of goods and services. Even if Seaborg had made it clear that the figures he was giving were money figures, they would have been misleading in the context of his discussion of physical well-being.

There is also a question of the propriety of using 1933, the bottom of the depression, as a base for measuring what purports to be a pattern of growth.

GARDINER C. MEANS

Washington, D.C.

Gardiner C. Means is quite right in pointing out that figures for the gross national product must be used with caution, but his corrected figures lend impressive support to the only point I was trying to make in my introductory paragraphs—namely, that we are a very

wealthy and fortunate group of people. I was making no attempt to discuss or to minimize the ups and downs of past economic developments.

The main thesis of my address, taken as a whole, was to show that very serious economic and political reversals may affect us in the future unless we encourage the development of trained brainpower in all fields, including economic analysis.

GLENN T. SEABORG

University of California, Berkeley

## About Meriones

Some recent articles [*Science* 123, 790 (1956); 124, 323 (1956)] dealt with the use of *Meriones* as laboratory animals. May I add some more information on this subject?

*Meriones shawi* is a common field rodent in Tunisia, largely used as a routine small laboratory animal. It has been bred in our institute at least since 1932 [A. Wassilieff, *Arch. Inst. Pasteur Tunis* 21, 298 (1932)]. When laboratory-bred, it is very easy to handle and never bites. An important feature is its great natural resistance to spontaneous bacterial or viral diseases. This rodent does not need any special care other than a room temperature 18°C or above and some cod liver oil weekly in the food.

*Meriones shawi* is strictly a monogamous animal, and it is a rule that the same male must always be put together with the same female. When a female is surely pregnant, she must be kept alone until the young are about 1 month old. Females are mated for the first time when they are about 10 months old. They give birth to two to three litters a year, each of two to six young. They are used for reproduction till they are about 2 years old.

One may find articles describing work in which meriones have been used for viral, rickettsial, leptospiral, and other studies in *Annales de l'Institut Pasteur de Paris*, in *Archives de l'Institut Pasteur de Tunis*, and in other French reviews. Without any great risk of error, I can assume that probably all the meriones actually found in European institutes have come from our own breed.

Regarding gerbils, many attempts to breed *Dipodillus campestris* were unsuccessful. But Vermeil [*Ann. Inst. Pasteur Paris* 88, 137 (1955)] has been able to establish in our institute a colony of *Gerbillus hirtipes* since 1951. This rodent has proved to be invaluable for studies on viruses, leptospira, leishmania, pathogenic molds, and on some human and animal endoparasites.

GÉRARD RENOUX

Institut Pasteur de Tunis,  
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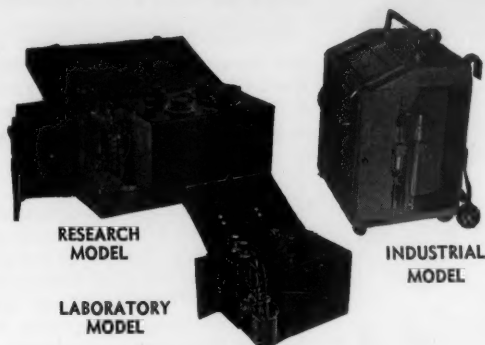
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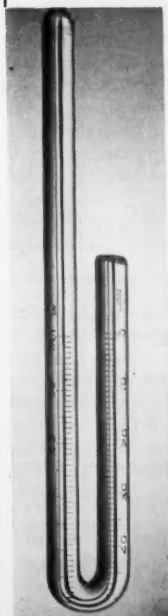
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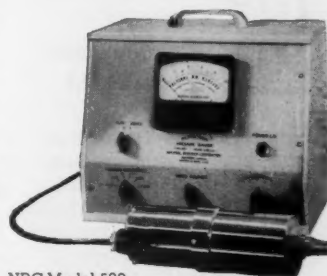
\* SACHAR *et al*, PROC. SOC. EXP. BIOL. &  
MED. 90, 323 (1955)

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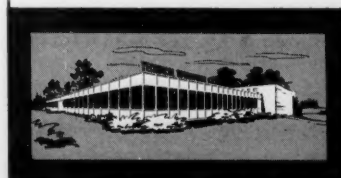
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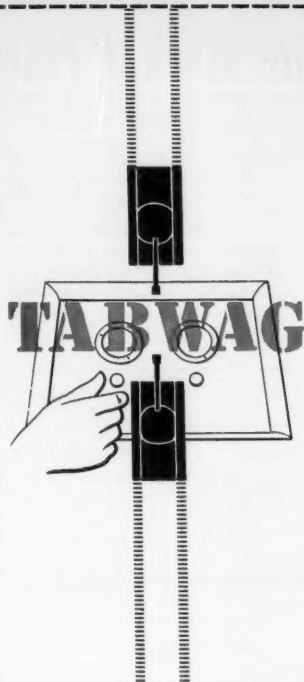
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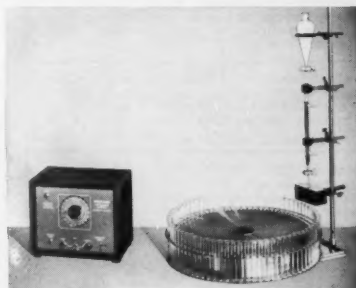
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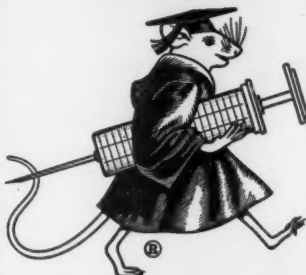
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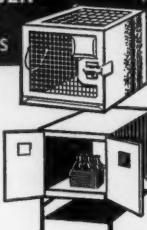
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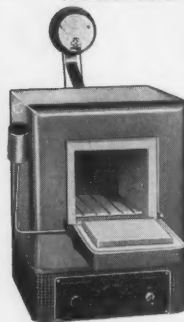
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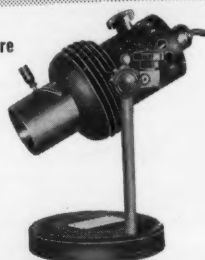
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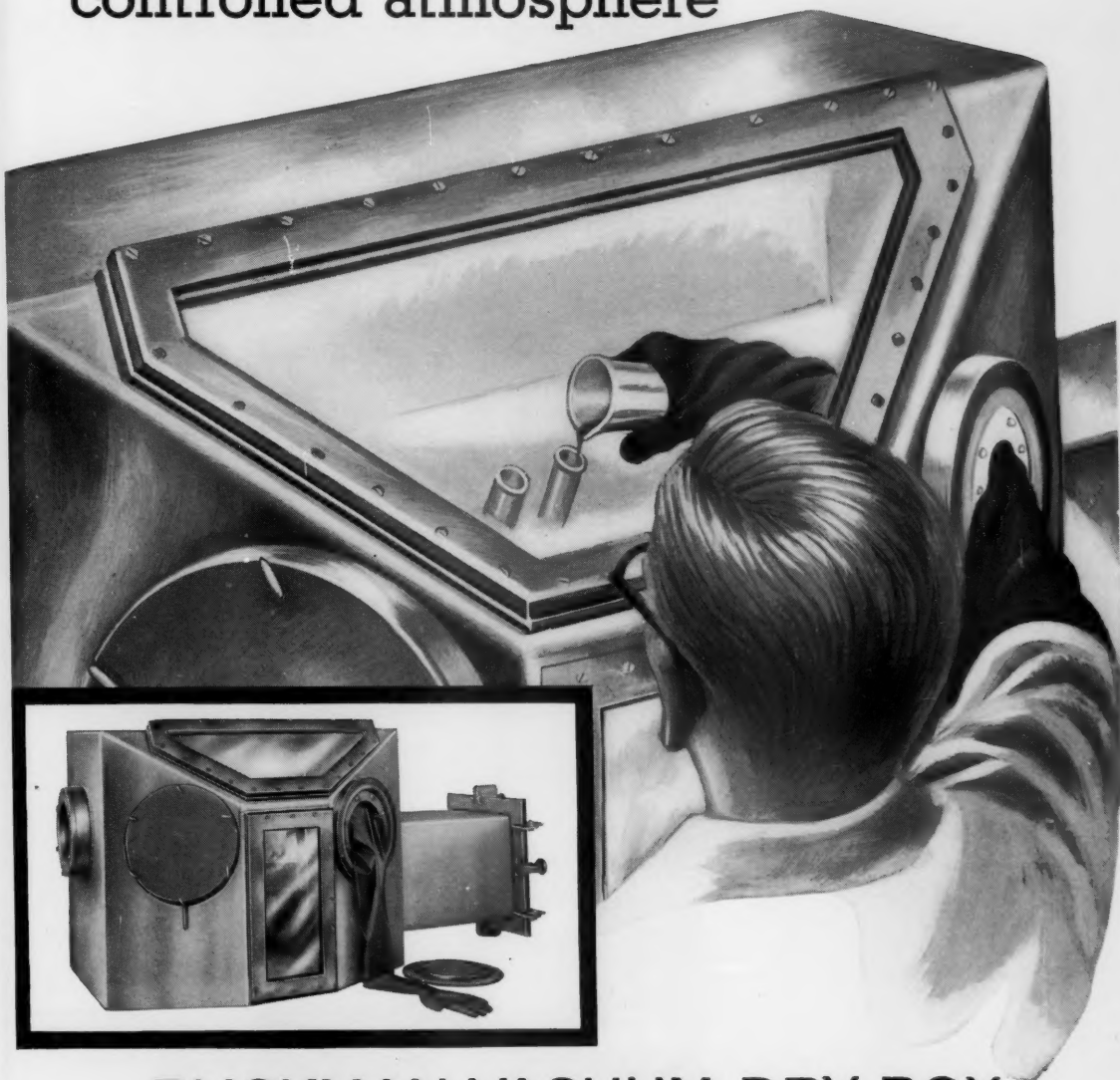
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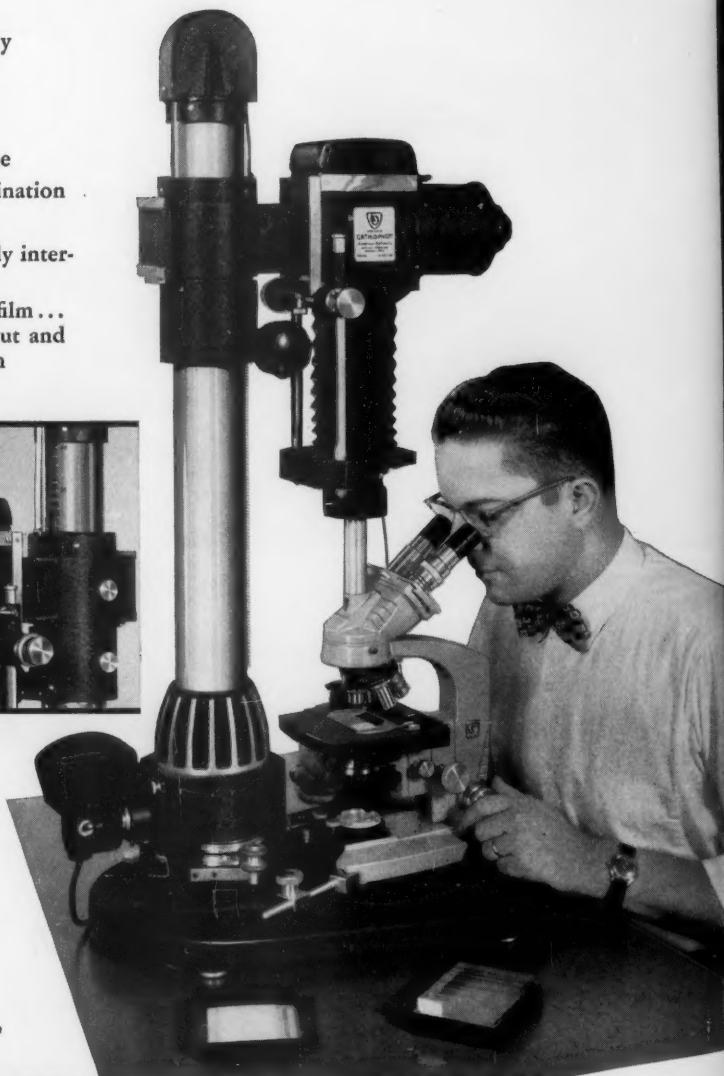
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